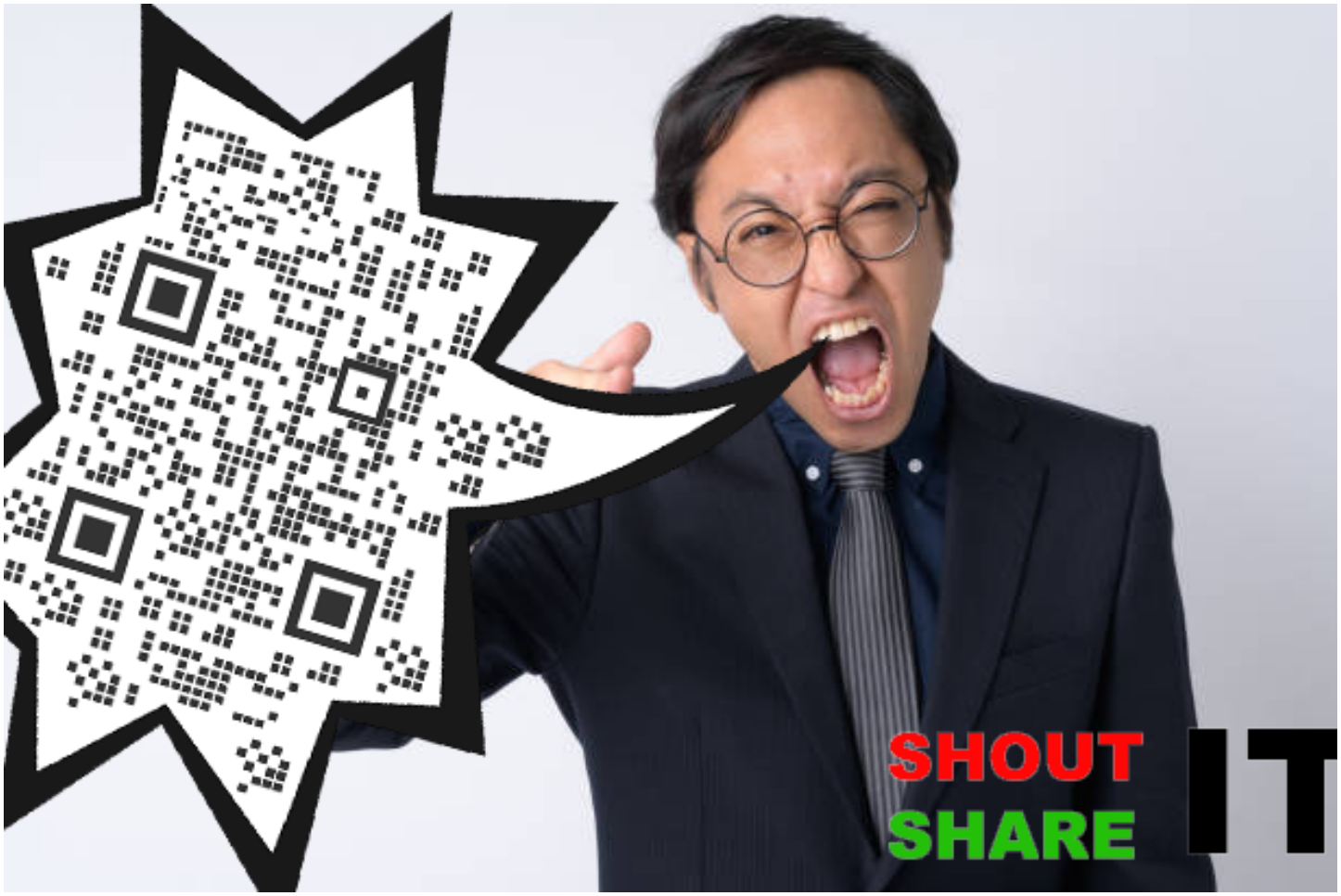
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The Great Basin Naturalist

VOLUME XI, 1951

Vasco M. Tanner, *Editor*

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PACIFIC ISLANDS HERPETOLOGY NO. IV ADMIRALTY ISLANDS (1)

VASCO M. TANNER
Professor of Zoology and Entomology
Brigham Young University
Provo, Utah

INTRODUCTION

This is the fourth report on the South Pacific Islands Herpetology. It is concerned with specimens collected on Los Negros Island of the Admiralty group.

The Admiralty Islands are located between 1° 30′ and 3° 10′ South Latitude and 146° and 148° East Longitude, being the most northerly of the Melanesion Islands. This group was discovered in 1616 by Schouten and Lemaire and consists of Manus, Los Negros, Los Reyes, Pak, Naura, Rambutyo, Baluan, Sauwai, Lou, Tong, and other small islands. All these islands are small except Manus which has an area of more than seven hundred square miles and has mountains that rise to a height of over three thousand feet. Los Negros, the next largest island of this group, forms an arc around the eastern end of Manus: the two being separated by a narrow channel. Within this arc is a good harbor, the Seeadler, which has depths ranging up to 120 feet. The central part of Los Negros was made into the large Momote airfield which was an important base in General Douglas MarArthur's campaign to win back the Philippine Islands and move on to Japan.

The Admiralties lies about 200 miles north and east of New Guinea and 260 miles west of New Ireland. New Hanover Island is between New Ireland and the Admiralties on an arc which extends through these Islands southward to the Solomon Islands. In 1940 there were about 14,000 natives on the islands, most of them en-

1Contribution No. 125, Dept. of Zoology and Entomology, B. Y. U. Provo, Utah.

gaged in cultivating the coconut, the only commercial crop produced there. They are worthy sea fareing people fishing and diving for pearl shells. Their food consists principally of coconut, taro, sago, yams, bananas, breadfruit, and sugar cane.

The herpetological fauna of this group is poorly known. Boulenger, 1887; Hediger, 1937; Mertens, 1934; Peters and Doria, 1878; Sternfield, 1918; and Vogt, 1912, have made some valuable reports on the reptiles of this area. However, their efforts have been confined mainly to the Bismarck archipelago. Sternfeld lists 16 species as having been collected on the Admiralty Islands, none of which were reported from Los Negros.

Mr. Reimschiissel landed on Los Negros August 27, 1944, and left on September 16, 1944. Collecting was possible only a part of his stay on the Island. He reports as follows concerning his camp and general conditions on the Island:

"My camp was located on a very bare part of the island where coral sand and coral rock made up the soil, mixed with old and decayed parts of plants which accumulated where the water puddled. Plant life is not as luxuriant as on Guadalcanal, the insects do not seem as numerous, but the bird life is plentiful. It rains one to two times each day. The water when in still pools has a milky color. Sometimes in small drainage areas the streams are also milky in color.

"My time was very limited and even at night the lights were turned off, forcing me to hold off with my record keeping or other writing. During these long hours of darkness I went hunting for frogs with a flashlight. Many of them were croaking and calling to one another. One species I observed is a small brownish one which hides under the coral rocks and amongst the plants. A beam of light would not frighten them so with their continual croaking I was able to catch five specimens."

I wish to extend my thanks to Mr. Reimschiissel for his interest and care in making collections of the reptiles and insects he encountered. The species listed below are, for the most part, new records for Los Negros Island.

AMPHIBIANS

Family Hylidae

HYLA INFRAFRENATA INFRAFRENATA GUNTHER

Gunther, Ann. Mag. Nat Hist., (3) XX, 1867, p. 56.

BYU 7309, 7314 Admiralty Islands (E. Reimschiissel) Sept. 16, 1944
BYU 7315, 7316 Los Negros
7326

These specimens agree in measurements and color with those reported from Morotai Island. Two adult specimens (7309, 7316) are dark lavender blue in spirits. From Mr. Reimschiissel's notes I record the following: "I saw a large green frog which eluded my grasp: it landed on an elephant's ear and I managed to catch it. It was green, long legged, with golden colored eyes—the pupil going longitudionally with the body. These were a number of small green frogs of which three or four were caught. I do not know whether these were immature or mature frogs but they were found in the forest area during the day time, out in the sun or shade or on the tops of leaves which would hold their weight. Another small greenish brown frog was caught in the forest living under logs."

Family Ranidae

PLATYMANTIS sp.

BYU 7310-11, 7320 Admiralty Islands (E. Reimschiissel) Sept., 1944
BYU 7321-22, 7323 Los Negros
7324

It is not possible to make a specific determination of this species at present. I have compared it with specimens of *P. papuensis weberi* Schmidt from the Tenaru River on Guadalcanal, collected by Robert C. Pendleton, and *P. corrugatus papuensis* collected at Hallandia, New Guinea by Mr. Reimschiissel. Dr. Walter C. Brown now has specimens BYU 7310-11 and 7320, making a study of them in comparison with *Platymantis* species now contained in some of the American collections. The four specimens before me are all about 30 mm. in length.

LIZARDS

Family Gekkonidae

GEHYRA OCEANICA (LESSON)

Lesson, Voyage Coquille, Zool. II, I, 1830, p. 42 pl. II, fig. 3.

BYU 7179 Admiralty Islands (E. Reimschiissel) Sept. 7, 1944
Los Negros

One female specimen of this wide spread species was reported for the Admiralty Islands by Sternfeld.

Family Scincidae

DASIA SAMARAGDINUM PERVIRIDIS BARBOUR

Barbour, Proc. N. Eng. Zool. Club, Vol. VII, p. 106, 1921

BYU 7162, 7207-18 Admiralty Islands (E. Reimschiissel) Sept., 1944
Los Negros

Rostal two times as broad as high, in contact with the first supralabial, nasal and frontonasal; no internasals present; prefrontals contact the frontonasal, two loreals, anterior supraocular, frontal, and meet at a point dorsally; frontal extends back to the frontoparietals and contacts three supraoculars; two pair of nuchals; lower eyelid scaly; ear-opening small with two small lobules anteriorly; supralabials six and seven in contact with subocular; eight supralabials and seven infralabials; mental twice as broad as high in contact with the first lower labial and the first large transverse chin-shield, which is in contact with the two lower labials on both sides. Dorsal scales not keeled, in 22-24 rows around the middle of the body. Fingers and toes quite long, with claws; fourth toe with 29-31 lamellae. Heel with a large oval scale. Body length 76-78 mm.; tail length 117-122 mm. Specimens in alsohol are a bluish green color throughout. Mr. Reimschiissel recorded the following concerning this skink: "The large green lizards turned slightly blue when in solution, are usually found on trees, especially where a Philodendron vine is growing. One of these green lizards, when caught, vomited a part of a grasshopper which is still in the bottle. September 5, caught three more green lizards on trunks of trees; fellows in the office say they run about in the early morning, even jumping for flies."

This subspecies is a geographical race distributed south from the Admiralty Islands throughout the Bismarck Archipelago, Solomon Islands to North East New Guinea. Loveridge (1948) reports it from many localities in New Guinea. Barbour's type was an adult from Fulkora, Ysabel Island, Solomon Islands. The thirteen specimens from Los Negros are fairly uniform in size and color; also in scale counts. Four specimens have a 22 scale ring around the body at the middle; seven (23) and two (24). Twelve have eight supralabials; one (9). All have seven infralabials, and two have 29 lamellae under the fourth toe; seven (30) and two (31). The scalation is similar in the Philippine, Morotai and Los Negros specimens. The Los Negros specimens lack the dark spots and gray color found on the body of the Morotai and Philippine specimens. The dorsal surface

of the hind legs of the Los Negros specimens is brown in color with some white spots. The thirteen Los Negros specimens average less in body measurements and are not as robust in body build as specimens of this genus from Morotai and Philippine Islands.

LYGOSOMA (LEIOLOPISMA) FUSCUM LUCTUOSUM (PETERS & DORIA)

Heteropus luctuosus Peters & Doria, Ann. Mus. Civ. Stor. Nat. Genova, Vol. 13, p. 364, 1878.

BYU 7163-66, 7172-78 Admiralty Islands (E. Reimschiissel) Aug. 25-
BYU 7221-26, 7228-30 Los Negros 30, 1944
BYU 7240-44

Rostral twice as broad as high, with a broad contact between the frontonasal and the nasal; frontonasal one and one half times as broad as high, nostril in the nasal; no supranasals; frontal as long as the frontoparietal and in contact with the two anterior supraoculars; 4 supraoculars; 7 supraciliaries; interparietal present but small; parietals in contact; a pair of nuchals and temporals; 7 supralabials, 4 before the subocular; 6 infralabials; submental large and in contact with the first and second infralabials, 31-34 mid-body scale rows; 29-33 lamellae under the fourth toe; total length, specimen BYU 7228, 160 (55-105) mm.; average body length 50 mm., tail length 81 mm. Color in spirits dark brown above, whitish on underside of body and the tail, otherwise there are no other color markings on the specimens.

Reimschiissel notes that these lizards are dark brown in color above and yellowish white beneath. He also records finding this brown colored species, and specimens that were dark colored with yellow body stripes, associated together on the coral rocks.

For the present I am inclined to follow Loveridge and consider the subspecies of *fuscum* in this area to be *luctuosum*. The Los Negros specimens under consideration agree very closely in body measurements and scale counts with Loveridge's description and key of the subspecies *luctuosum*. Loveridge considered one specimen, from New Britain archipelago, and now in the Museum of Comparative Zoology, as belonging to this subspecies.

Robert Sternfeld, 1918, reported *Lygosoma* (*Liolepisma*) *fuscum* from New Britain and Galwan Island, one of the Admiralty group. He reports that the eight Galwan Island specimens have 32 mid-body scale rows, and 28 to 30 lamellae under the fourth toe.

EMOIA MIVARTI BOULENGER

Boulenger, Cat. Liz. III, p. 292, pl. XXIII, fig. 1, 1887.

BYU 7167-7171	Admiralty Islands	(E. Reimschiissel)	Aug., 1944
BYU 7186-7206	Los Negros		Sept., 1944
7234-7239			

Rostral twice as broad as high, in contact with first upper labial, two small nasal scales and frontonasal; frontonasal one and one half times as broad as long; prefrontals widely separated by the frontal; frontal as long as the undivided frontoparietal; parietals and temporals large, nuchals small; four supraocular, two loreals between the nostril and preocular; seven supraciliaries; lower eyelid with a transparent disk; ear opening oval, with two short anterior lobules; supralabials seven to eight, five before the large subocular; seven to eight infralabials, submental larger than the mental. Scale rows at the middle of the body 33 to 36 (4-33, 7-34, 7-35, 2-36), smooth and smaller laterally. Preanals only slightly enlarged. Length of body and tail 120 mm. (50+70). Limbs well developed; fourth toe with 40 to 46 lamellae.

The color of preserved specimens is dark brown dorsally, bordered by two whitish lines which involve part of two rows of scales. These two white lines have their origin in the supraciliaries and pass backward through the temporals and nuchals along the body above the bind legs and on to the tail. Another pair of white lines extend from the supralabials to the groin. In some specimens there are two to five lines radiating out from the axilla. The ventral part of the body is light in color.

Mr. Reimschiissel reports that live specimens of this species had white and yellowish stripes on the dark brown dorsal body wall and were white in color on the venter and tail.

Loveridge, 1948, considers Boulenger's *Tygosoma mivarti* (part?) from Admiralty Islands as a synonym of *Emoia baudinii boudinii D & B.* I have not followed Mr. Loveridge in this treatment of the Los Negros specimens since the scale rows around the middle of the body, the lamellae of the fourth toe, the body and tail length, and general color agrees more with Boulenger's description than that set forth for *baudinii* by Loveridge. Sternfeld lists *mivarti* from the Admiralty Islands. He reports the body scale rows as 31 to 36 and the lamellae of the fourth toe as 35 to 42.

Specimens number BYU 7196 and 7235 are, through an exchange, in the Stanford University Natural History Museum.

EMOIA ATROCOSTATA (LESSON)

Lesson, Voy. Coquille Zool. II p. 50, pl. IV, Fig. 3, 1830

BYU 7180 Admiralty Islands (E. Reimschiissel) Sept. 7, 1944
Los Negros

Rostral two times as broad as high, in contact with the first supralabial, two nasal and frontonasal scales; frontanasal not as high as the frontal with which it forms a broad contact; a small interparietal separated from the frontoparietal; two loreals; lower eyelid with a transparent disk; ear opeing as large as the palpebral disk; mental larger than the submental; first infralabial wedge shape between the mental and second infralabial, not in contact with the submental. Seven lower and seven upper labials; 39 scale rows, about the same in size, around the body at the middle; scales smooth; preanal scales enlarged. Limbs well developed; fourth toe with 37 smooth lamellae below.

Color greyish above, with small black dots irregularly placed over the body; under surface of body and tail whitish. Total length of specimen is 182 mm. (63+119). Only one specimen of this species collected.

Sternfeld lists two specimens from Ilim Island of the Admiralty group. The body scale rows are reported as 38 and the lamellae of the fourth toe 36-38. This species has a wide distribution according to Nelly de Rooij.

EMOIA CYANOGASTER (LESSON)

Lesson, Zool., in Duperry, Voyage autour du Monde sur La Coquille, Vol. 2, pt. 1, p. 47, pl. III, fig. 3, 1830.

BYU 7181, 7233 Admiralty Islands (E. Reimschiissel) Sept., 1944
Los Negros

Snout long, pointed, rostal broader than high, frontonasal as broad as high, frontal narrowly in contact with the frontonasal; internasals not longer than the frontal; interparietal not present; parietals large and in contact behind the frontoparietals; nuchals and temporals small; loreals, second about twice as long as the first; four supraoculars; six superciliaries; lower eyelid with transparent disc; supralabials, seven to eight; infralabials, six; submental larger than the mental. Ear opening small, guarded with one or two short lobules; body scales smooth, longer dorsally than laterally, 24 rows around middle of body; two preanal scales enlarged; total length of specimen BYU 7181, 178 mm. (50+128), the tail is more than two

and one half times as long as the body; legs well developed, especially the hind ones which may be extended to reach the axilla of the front ones; lamellae under the fourth toe, 82-87.

Color above brown with two greenish blue lines extending from back of the eyes to the thighs; iridescent with small black dots, under color a blue-green.

Sternfeld reports one specimen of *cyanogaster* from the small island of Pak; de Rooij records it from the Bismarck Archipelago and Loveridge lists one specimen from New Britain. This species has very fine lines and is one of the most interesting species of the genus Emoia. Sternfeld lists *iridescens* Blgr. from Pak island, while Loveridge considers *iridescens* as a synonym of *cyanogaster*.

EMOIA CYANURA (LESSON)

Lesson, Zool. in Duperry, Voyage autour du Monde sur La Coquille, Vol. 2 pt. 1, p. 49, 1830.

BYU 7182 Admiralty Islands (E. Reimschiissel) Sept., 1944
Los Negros

Rostral about twice as broad as high; nortril between three small scales; frontonasal broader than long, forming a broader suture with the rostral than the frontal; no internasals present; frontal not as long as the frontoparietal which is single; interparietal not present; parietals large; nuchals a little broader than the temporals; lower eyelid with a transparent disk; ear opening oval with two or three short anterior lobules; supralabials seven, four before the large subocular, infralabials seven; mental two times as broad as long; scales smooth, the dorsal ones larger than the lateral ones, 30 rows around the middle of the body; preanal scales slightly enlarged, 69 lamellae under the fourth toe. Total length 129 (46+83).

Color black with three cream white iridescent streaks on the back; the dorsal stripe covers the inner positions of the two dorsal scale rows while the two lateral stripes are on the outer two thirds of a scale row. The ventral color is white under the chin becoming bluish around the hind legs and the tail.

Eight specimens of this species were reported from Olim Island of the Admiralty group by Sternfeld. Reimschiissel collected only a single specimen on the Island of Los Negros. The lamellae of the fourth toe on the specimen before me are greater in number than is usually reported for this species. The other characteristics seem to justify considering it as *cyanura*.

EMOIA CAERULEOCAUDA de VIS

deVis, Ann. Queensland Mus., No. 2, p. 12, 1892.

BYU 7183, 7219-20 Admiralty Islands (E. Reimschüssel) Sept., 1944
Los Negros

This species is represented by three specimens which agree with Loveridge's findings. The prefrontals are broad and fused with the interparietal; parietals large, temporals and nuchals small; lower eyelid with a transparent disk; ear-opening oval, same size as the palpebral disc. Body with 31-34 smooth scales around the middle, the dorsal scales larger than the lateral ones; fourth toe with 46-50 smooth lamellae below.

Color in life and spirits similar to *cyanura*, except the light stripes are not as iridescent in *caeruleocauda* and the under parts and tail are not as blue green.

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NEW SPECIES OF DOLICHOPODIDAE FROM CALIFORNIA AND UTAH (DIPTERA).

F. C. HARMSTON
Salt Lake City, Utah

This report includes descriptions of five apparently undescribed species of Dolichopodidae from California and one species from Utah.

CHRYSOTUS **SILVICOLUS** Harmston, n. sp.

Male. Length, 2 mm. Face greenish, lightly dusted with gray pollen, its lower portion extremely narrow, barely separating the eyes. Front green, metallic. Palpi white, very prominent, as long as second joint of middle tarsi, each with a conspicious black hair near the tip on anterior surface. Lower orbital cilia white, about eight of the upper cilia on each side black. Antennae black; third joint small, about as long as wide, rounded at tip. Arista apical.

Thorax and abdomen green, metallic, lightly dusted with brownish-gray pollen. Bristles of thorax and abdomen black. Legs wholly black. Fore coxae with black hairs and bristles on anterior surface. All femora with a row of delicate, black, hair-like bristles on lower, inner edge. Posterior tibiae not enlarged, with several prominent bristles on posterior surface, but without conspicuous hairs. Halteres yellow. Calypters yellow, with black cilia.

Wings gray, hyline; fourth vein noticeably convergent toward third vein beyond the cross-vein, its last portion parrell with third vein and ending well in front of the apex of wing; cross-vein situated at basil third of wing, one-third the length of apical segment of fifth vein.

Female. Similar to the male in coloration of the body and legs. Face as wide as the distance between the tips of third and fourth longitudinal veins. Palpi black, much larger than those of the male.

Described from 27 males and 17 females from California, collected by Mr. P. H. Arnaud, Jr., during the period June 29 to August 18, 1948. Six males and 16 females, which include holotype male and allotype female, were taken at Pinecrest, Tuolumne County; 21 males and one female were taken at Belle Meadows, Tuolumne County. Holotype male and allotype female to be deposited in the

insect collection of the California Academy of Sciences; paratypes to be deposited in the U. S. National Museum, University of California and in the collection of Mr. Arnaud and the writer.

Differentia: *Chrysotus silvicolus* n. sp. resembles *C. californicus* Van Duzee, but differs in possessing large white palpi and in having the cilia of calypters black. In *californicus* the palpi are small, black and the cilia of calypters are pale.

MEDETERUS **ARNAUDI** Harmston, n. sp.

Male: Length, 3 mm.; length of wing, 3.5 mm. Face and front thickly covered with silvery-gray pollen; width of face equal to the distance between the tips of third and fourth longitudinal veins. Proboscis and palpi black, the latter with prominent pale bristles on anterior surfaces. Antennae black; third joint rounded at tip, about as long as wide. Arista sub-apical. Post-orbital cilia white, except for the upper six bristles, which are black.

Thorax and scutellum dull green with supreous reflections, densely covered with gray pollen; bristles on dorsum of thorax and the four prominent scutellar bristles, black; three prominent white bristles are inserted in a row above the base of fore coxae. Abdomen green, the ground color almost completely obscured by the dense covering of gray pollen; hairs of abdomen pale. Hypopygium black; posterior appendages black, about as long as the maximum width of posterior femora, their apices pointed, with a black, thorn-like, oblique spine near the tip on outer side; inner appendages yellow, nearly twice the length of the posterior appendages.

Fore coxae yellowish-brown, their anterior surface clothed with pale hairs, the bristles at tip yellow. Middle and hind coxae black, each with a prominent white bristle on outer surface, their anterior surfaces with pale hairs. Femora, tibiae and tarsi yellow, the last two joints of all tarsi and the tips of the other joints infuscated. Posterior femora with a row of prominent yellow bristles on the upper basal half. Posterior basitarsus narrowed at the base, where it bears a small, tooth like protuberance on inner edge. Length of anterior tarsal joints as 12-11-9-5-4; of middle tarsi as 22-11-9-5-4; of posterior tarsi as 9-22-11-6-5. Halteres and clypters white, the latter pale cilia.

Wings hyaline, without maculations, the veins brownish-yellow; third and fourth veins parallel and rather close together at tips;

distal segment of fifth vein about one-half the length of posterior cross-vein.

Female. Similar to male in coloration. The posterior basitarsus is not narrowed at the base, and it lacks the tooth-like protuberance present in the male.

Described from 36 males and 48 females taken in California. Thirty-four males and all the females were collected at Redwood City, during the period September 2, 1943 to June 12, 1948 by Mr. P. H. Arnaud, Jr. One male was taken by Mr. Arnaud at San Jose, May 20, 1947; another male was collected by Mr. W. W. Wirth, at Sonoma, September 3, 1948. The types will be distributed as follows: Holotype male and allotype female, both from Redwood City, June 12, 1948, and several paratypes in the insect collection of the California Academy of Sciences; paratypes in the U. S. National Museum, University of California and in the collections of Mr. Arnaud and the writer.

Differentia: *Medeterus arnaudi* n. sp. closely resembles *M. californicus* Wheeler, to which it traces in the Van Duzee table of North American species of *Medeterus* (Psyche, 35:36-43, 1928). However, in *californicus* the distal segment of the fifth vein is only one-half the length of the posterior cross-vein; also, in *californicus* the large bristles on the outer surface of middle and hind coxae are black, whereas with *arnaudi* n. sp. the corresponding bristles are white.

APHROSYLUS **WIRTHI** Harmston, n. sp.

Male. Length, 2 mm.; length of wing, 2.4 mm. Face and front velvety black, the former of approximately the same width as middle femur. Palpi black, the anterior surfaces with a scattering of short, stiff hairs. Postorbital cilia black. Antennae black; third joint triangular, slightly longer than wide, pubescent, with several short, stiff bristles near the base on upper and lower edges. Arista apical, slightly longer than the antennae, its basal half conspicuously thickened.

Thorax dull, black, lightly dusted with brownish pollen; pleurae and scutellum concolorous with dorsum, the latter with a pair of prominent marginal bristles and a single pair of small, hair-like bristles situated outside the larger pair. Abdomen black, the first

segment extending leaf-like over the base of the halteres. Hypopygium black, bulbous, entending forward to the posterior margin of the fifth segment; outer lamellae black, broad at base, with a lateral, leaf-like process on each side, narrowed at the middle, the apical half finger-like, curved upward and fringed with short black hairs.

Legs black, with conspicuous black hairs and bristles. Fore coxae with short, stiff black bristles on anterior surfaces. Fourth and fifth segments of all tarsi compressed dorso-ventrally. Calypters and their cilia black; halters with black knob, the stem brownish.

Wings uniformly smoky gray in color; second, third and fourth longitudinal veins jet black and very conspicuously broadened; last section of fifth vein and the cross-vein of equal length; anal angle evenly rounded.

Described from 11 males and 14 females taken in California by Mr. W. W. Wirth. Nine males and 10 females were taken at Moss Beach, San Mateo County, March 21, 1948; one male and two females taken at Pebble Beach, San Mateo County, January 3, 1948; one male at Carmel Beach, Monterey County, January 4, 1948 and two females at Bodega Bay, Sonoma County, October 19, 1947. Holotype male and allotype female, both from Moss Beach, San Mateo County, March 21, 1948 deposited in the California Academy of Scieneces; paratypes in the collection of Mr. Wirth and the writer.

Differentia. *Aphrosylus wirthi* n. sp. is readily distinguishable from the known members of the genus by having greatly broadened second, third and fourth longitudinal wing veins. The uniformly dark wings and black knobs of the halteres offer other identifying marks.

NEURIGONA **TORRIDA** Harmston, n. sp.

Male. Length, 2.8 mm.; length of wing, 2.6 mm. Face silvery pollinose, the lower portion narrowed with its sides parallel. Front silvery pollinose. Palpi yellow. Antennae yellow; third joint brown on apical half; arista black, dorsal. Postorbital cilia pale.

Dorsum of thorax and the pleurae greeninsh-black, with dense covering of gray pollen. Venter and first two segments of abdomen yellow, the remainder of abdomen metallic, green with cupreous reflections. Hypopygium yellow, rounded at apex, without conspicuous external appendages.

Coxae and legs yellow; middle coxae lightly infuscated on outer surface. Hairs and bristles on anterior surface of all coxae, yellow; bristle on outer surface of posterior coxae brown. Fore tibiae considerable thickened, equal in diameter to the fore femora. First and second joints of fore tarsi of equal length, each approximately one-half the length of fore tibia; third joint yellow, somewhat broadened, one-half the length of fourth joint; forth joint noticeably flattened, its apical half black, slightly more than twice the length of third joint; fifth joint black, flattened, about one-third the length of fourth joint, the inner claw normal, the outer claw greatly flattened and truncate at tip. Length of anterior tarsal joints as 16-16-3-7-3; of the middle tarsi as 32-14-7-5-5; of posterior tarsi as 20-18-8-6-5. Halters and calypters yellow, the latter with pale cilia.

Wings grayish hyaline; fourth vein arcuate from a point slightly beyond the cross-vein, from which point it is bowed toward the third vein, so that the tips of third and fourth venin are well in front of the apex of wing; distal segment of fifth vein slightly longer than the cross-vein, their comparative lengths as 7:5.

Described from one male taken at Indio, California, April 1, 1948 by Mr. R. Coleman. This specimen was forwarded to me for identification by Mr. W. W. Wirth. The holotype male will be deposited in the California Academy of Sciences.

Differentia. The peculiar structure of the fore tarsi will readily distinguish *Neurigona torrida* n. sp. from other members of the genus.

SYNTORMON **CALIFORNICUM** Harmston, n. sp.

Male. Length, 2.7 mm. Face approximately the same width as anterior femur; lower two-thirds densely silvery pollinose, upper third lightly pollinose, the blackish ground color perceptible. Front blue, metallic. Antennae black; second joint overlapping third joint on inner surface for about one-third its length; third joint approximately the length of posterior basitarsus, roughly three times as long as wide. Arista apical, as long as third joint. Lateral and inferior postorbital cilia pale, the upper cilia black.

Thorax dark green, metallic, with scarcely a trace of white pollen. Abdomen concolorous with thorax, yet the dorsum with bronze reflections. Hypopygium mostly embedded; outer appendages small, elongate-oval, approximately the same length as last segment of middle tarsi, clothed with minute pale cilia. Stems of

halters brown, the knobs white; calypters white with narrow brown margin, their cilia white.

Coxae, femora, posterior four tibiae and all tarsi black; anterior tibiae and the extreme base of the middle tibiae brownish-yellow. Fore coxae with white hairs and bristles on anterior surface. Middle femora with a row of about six evenly-spaced bristles on the lower edge. Posterior tibiae gradually but conspicuously thickened on apical half. Posterior basitarsus notoiceably bent, without a sinuate bristle on lower surface. It is possible that this species possesses a sinuate bristle on the lower surface of posterior basitarsus, which may have been broken off the single specimen at hand. Joints of fore tarsi as 15-6-5-5-4; of middle tarsi as 15-6-5-4-4; of posterior tarsi as 8-8 (other joints missing).

Wings grayish hyaline; the apical one-fourth conspicuously infuscated, appearing smoky; fourth evin in apex of wing; posterior cross-vein olcated at middle of wing; wing norrowed toward the base, the anal angle not at all prominent.

Described from one male taken two miles east of Canby, Modoc County, California, July 12, 1947 by R. L. Usinger. Holotype male to be deposited in the University of California insect collection.

Differentia. *Syntormon californicum* n. sp. is readily identified by the coloration of its wings, it being the only known member of the genus possessing wings with prominent infuscation on apical one-fourth.

ARGYRA **UTAHNA** Harmston, n. sp.

Male. Length, 3.6 mm.; length of wing, 3.5 mm. Face silvery pollinose, moderately wide, equaling the width of third antennal joint. Front lightly dusted with silvery pollen, yet the greenish ground color rather evident on upper portion. Papi black, heavily dusted with silvery pollen. Lower cilia and the whiskers white. Antennae black; first joint with coarse black hairs on upper surface; third joint long, obtusely pointed, its length equaling the length of the posterior cross-vein. Arista apical, very prominent and equaling the length of third antennal joint.

Dorsum of thorax green, metallic,with coppery reflections. Pleurae green with violet reflections, dusted with silvery pollen. Scutellum metallic green, with four prominent marginal bristles and many hairs on the dorsum. Abdomen dark green, metallic, with

bronze reflections; the second and third segment each with a large, dull yellowish area on lateral portions. Hairs and bristles of the abdomen black. Hypopygium and the small finger-like, outer lamellae black.

Coxae black, the apices of fore pair slightly yellowish; anterior surfaces of coxae with black hairs and bristles. Femora yellow, the posterior pair blackened on apical fourth. Fore femora with long slender black hairs on outer surface, their length equaling the width of femora. Tibiae yellow, the posterior pair blackened and slightly thickened on apical third. Fore tarsi yellow, the fourth and fifth segments black; middle tarsi black from tip of second segment; posterior tarsi black. Length of fore tarsal segment as 20-6-5-4-4; of middle tarsi as 24-9-7-4-4; of posterior tarsi as 15-12-8-5-3. Halteres yellow; calypters yellow with black tip, their cilia pale.

Wings grayish hyaline, the veins brown; last section of fourth vein bent forward at its middle; last section of fifth vein one and one-half times the length of cross-vein.

Described from one male taken by the author at Monticello, Utah, July 7, 1946. Type to be deposited in the California Academy of Sciences.

DIFFERENTIA. *Argyra utahna* n. sp. closely resembles *A. nigricoxa* Van Duzee in general appearance and coloration. While the two species differ in the structure of the external hypopygial lamellae they are most easily separated by the chaetotaxy of middle femora. *Nigricoxa* possesses a row of five long, evenly-spaced, black bristles on lower edge of middle femora. These bristles are longer than the width of femora; in the case of *utahna* n. sp. the lower edges of middle femora are devoid of conspicuous bristles.

ON EIGHT NEW SOUTHERN MILLIPEDS

RALPH V. CHAMBERLIN
Emeritus Professor of Biology
University of Utah
Salt Lake City, Utah

The new millipeds described in the present paper were detected in the course of a study of a collection made by Hugh Hanson, now of the Arizona State College at Tempe, chiefly in June and July of 1947. With the exception of the type of *Pseudotremia hansoni*, which was taken at Pineville, Ky, the specimens were all taken near Gatlinburg, Tenn., in the Smoky Mts. I wish here to express my thanks to Mr. Hanson for the privilege of examining his interesting collection and for his patience in awaiting a delayed report on it.

Family Paraiulidae

UROBLANIULUS **EXUL** Chamberlin, new species

General color dark brown, without definite annuli or other markings, but each tergite becoming darker toward its caudal margin; last tergite and anal valves nearly black. Head dark above, with a pair of light spots between antennae; paler on lower part of face. Antennae nearly black. Legs colorless.

Stipes of mandibles in the male only moderately produced at distal corner.

Collum with anterolateral corner widely rounded; a single straight sulcus just above margining sulcus on each side.

Tergites smooth and shining above, only minutely punctate. Segmental sulcus sharply impressed, not excurved at level of the repugnatorial pore which is well removed from it.

Form of cauda as shown in fig. 1.

The features of the gonopods are shown in figs. 2 and 3.

Diameter of male holotype, 1.8 mm.

Locality: Tenn.: Gatlinburg Cove, July 22, 1948.

A paratype taken at the same place on June 13, 1947, is lighter in color than above given for the holotype and shows a series of black spots along the sides over the repugnatorial glands and some cross-striping above.

This species, and the closely related *fumans* (Chamb.) occurring in the same region, differ from *canadensis*, the generotype, super-

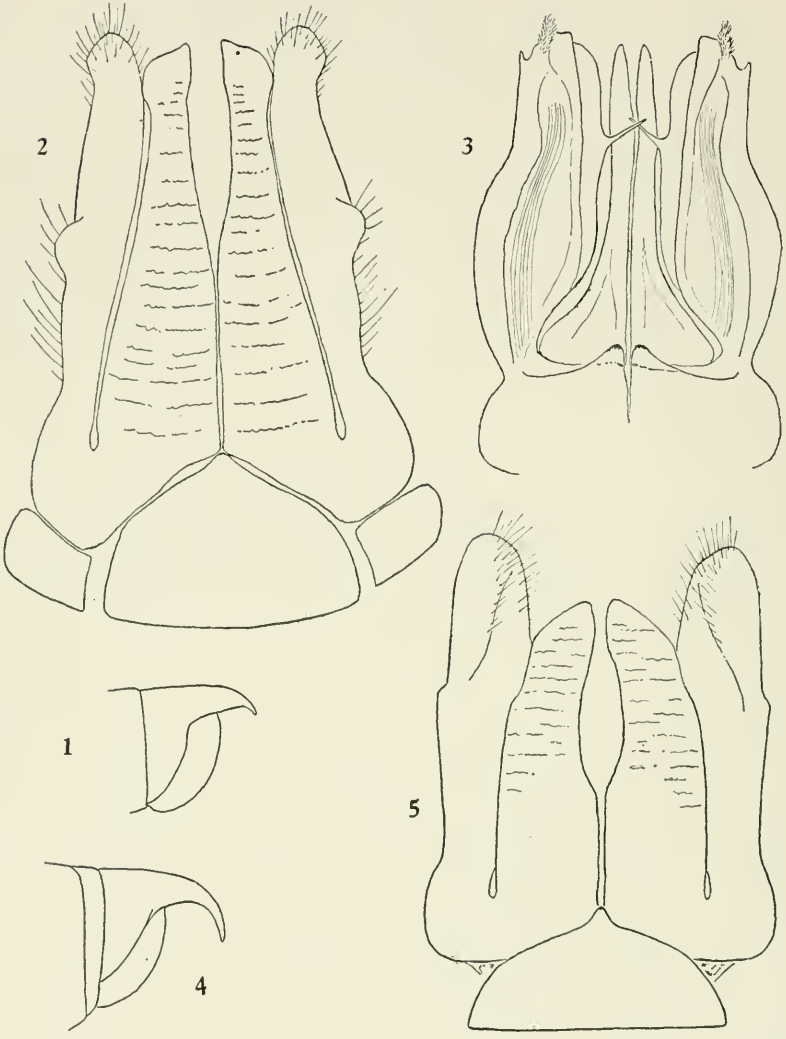

Fig. 1. *Uroblaniulus exul,* n. sp. Anal tergite viewed from the side.
Fig. 2. The same. Anterior gonopods, cephalic aspect.
Fig. 3. Posterior gonopods, caudal aspect.
Fig. 4. *Uroblaniulus dixinus,* n. sp. Anal tergite, lateral view.
Fig. 5. The same. Anterior gonopods, caudal aspect.

ficially in the less strongly uncate cauda. In the gonopods they differ from that species in the longer coxites of the anterior pair and in the much longer, more spine-like process from the mesal margin of the principal branch of the posterior pair.

UROBLANIULUS **DIXINUS** Chamberlin, new species

Differing from *fumans* and *exul*, the two other species of the genus known to occur in the Smoky Mt. area, in the larger, more strongly uncate cauda, as represented in fig. 4, which may be contrasted with fig. 1, representing the cauda of *exul*, to which that of *fumans* is similar. It also differs from those species in the shorter, proportionately broader coxal plates of the anterior gonopods and in the broader distal ends of the telopidites.

Anterior gonopods of form shown in fig. 5.

The type specimen of this species is strongly annulate, there being across dorsum of each tergite a blackish stripe behind the sulcus, this stripe narrowing and fading out down each side and above leaving a light colored caudal border; across the dorsum in front of the sulcus a dark band enclosing light spots. Sides light. Legs dusky over a yellowish background. Antennae black. Last tergite and anal valves black.

Diameter, 1.8 mm.

Locality: Tenn.: Gatlinburg. July 2, 1947.

Genus **TENIULUS** Chamberlin, new

Characterized by having the mesal blade of the posterior gonopods partly sheathed by the major branch, with its free end normally resting on a pilose lobe from the mesal margin of the principal branch on the opposite, ectal, side of which typically shows a retrorse process or barb. Associated with each gonopod on its mesal side are two strongly setiferous processes of which the posterior is the longer, the setae very long. Coxal plates of anterior gonopods distally acuminate and typically exceeding the telopodites in length. Cauda produced and more or less uncate as in *Uroblaniulus*.

Generotype: *Teniulus parvior* Chamberlain, new species.

The genus includes also *T. setosior*, described below.

TENIULUS SETOSIOR Chamberlin, new species

In coloration this is normally a strongly annulate form, showing apale caudal border on each tergite in front of which is a brown to chestnut annulus; in front of the sulcus across dorsum a blackish band enclosing a series of light dots. Last tergite and anal valves black. Antennae usually nearly black. Legs brown or dusky over a yellowish background. Head with the usual black areas between

eyes and extending down between antennae where it encloses a pair of rather large light spots.

The stipes of mandibles are shown in fig. 6.

From the closely related *T. parvior* readily distinguished in having the cauda more strongly uncate, this near its middle being bent down in the vertical direction as shown in fig. 7.

Gonopods as represented in figs. 8 and 9. In the anterior pair it will be noted that the coxites are more slender and more prolonged than in *parvior*.

This is a slender form in which the male is about 1.6 mm. in diamenter, the female 1.8-1.9 mm.

Locality: Tenn.: Gatlinburg.

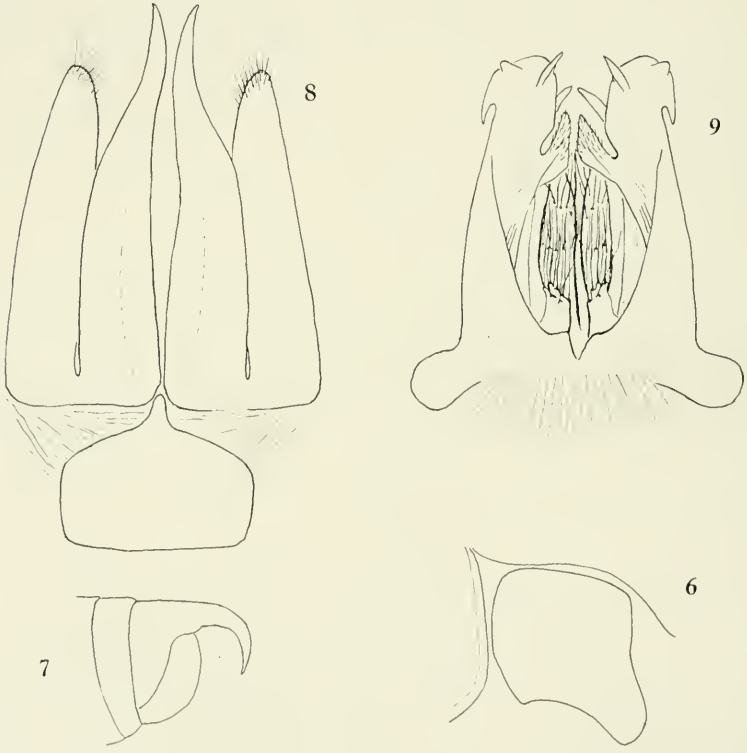

Fig. 6. *Teniulus setosior*, n. sp. Stripes of right manible, lateral view.
Fig. 7. The same. Anal tergite, lateral view.
Fig. 8. The same. Anterior gonopods, cephalic aspect.
Fig. 9. The same. Posterior gonopods, caudal aspect.

The male holotype was taken July 27, 1947 in the oak-chestnut area. Three females were taken in "grassy bald" on July 2, 1947.

TENIULUS PARVIOR Chamberlin, new species

Color pattern nearly as in *setosior*. From that species readily distinguishable by its smaller size and the form of the cauda, this being straight over most of its length and bent down only toward the distal end as shown in fig. 10.

Gonopods as represented in figs. 11 and 12.

Diameter, 1 to 1.5 mm.

LOCALITY: Tenn.: Gatlinburg.

About twenty specimens, partly immature and mostly females, taken June 21, 1947 in "grassy bald", also three specimens, including the male holotype, taken June 18, 1947 in "spruce-fir."

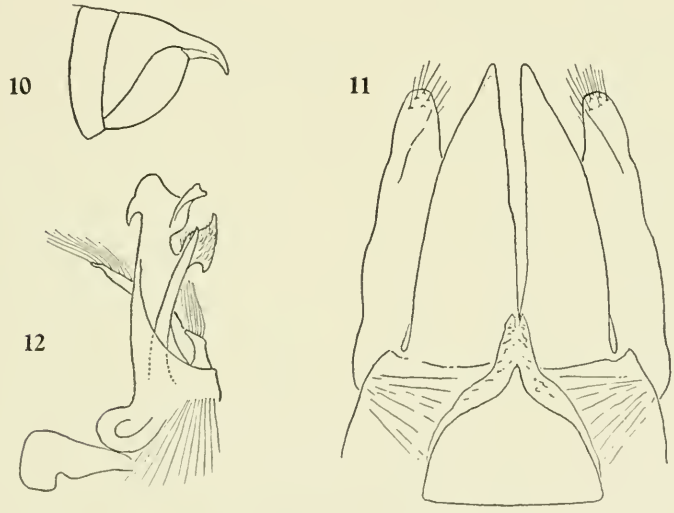

Fig. 10. *Teniulus parvior*, n. sp. Anal tergite, lateral view.
Fig. 11. The same. Anterior gonopods, cephalic aspect.
Fig. 12. Left posterior gonopod, cephalic aspect.

Genus **SHOSHONIULUS** Chamberlin, new

Differing from the related *Uroblaniulus* and *Teniulus* in the large bent telopodites of the anterior gonopods and especially in the posterior gonopods which apparently lack seteferous lobes and the anterior branches of which meet at the mesal line.

GENEROTYPE: *Sailus atlantus* Chamberlin

In addition to *Shoshoniulus idahoanus*, *Saiulus atlantus*, would seem to conform to this genus.

Family CONOTYLIDAE

TRICHOPETALUM **MONTIS** Chamberlin, new species

Of a dilute yellowish color, the legs colorless.

Ocelli black, forming a lunate patch; typically 9 in number, arranged in two series, with six in the upper row and three in the lower. Antennae with first four joints slender, the fifth abruptly clavately much thickened; third and fifth joints longest. (See fig. 13).

The distinctive features of the male gonopods and of the ninth legs are shown in figs. 14 and 15.

Length, about 4.5 mm.

LOCALITY: Tenn.: Gatlinburg.

A male taken in grassy area July 18, 1947 and a male in spruce-fir area July 11, 1947.

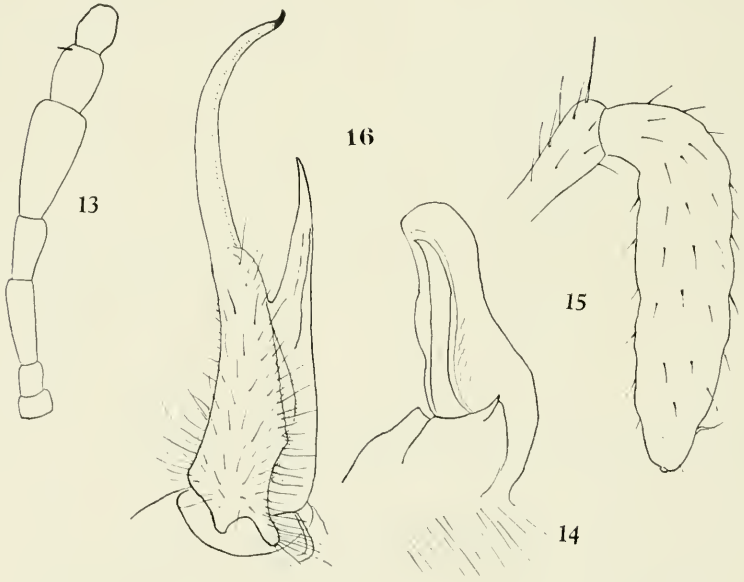

Fig. 13. *Trichopefalum montis*, n. sp. Antenna.
Fig. 14. The same. A gonopod, anterolateral view.
Fig. 15. The same. A ninth leg of male, anterior aspect.
Fig. 16 *Borarja monticolene*, n. sp. Right gonopod, preaxial view.

In arrangement of ocelli similar to *T. lunatum* Harger, the generotype, but in the structure of the gonopods quite distinct from that and others so far known.

Family Cleidogonidae

PSEUDOTREMIA **HANSONI** Chamberlin, new species

Color horn brown, paler on lower part of sides and in an areolate spot mesad of each shoulder in each tergite and in a stripe along median sulcus; prozonites more greyish. Legs yellow, with tarsi darker, brownish.

Body less fusiform than usual, being of nearly uniform width from sixth to twentieth segment.

Ocelli about 21 in number, arranged in five definite series parallel with vertex of head; e.g., 6.5.5.3.2, from above downward.

Collum margined anteriorly, thickened below each lateral angle.

Shoulders of the following segments prominent in the more anterior ones, gradually decreasing to the twenty-sixth segment. Lateral striae conspicuous on all segments except the last few where they are obsolete. Tergites of first three segments essentially smooth. Beginning on fourth tergite a few longitudinal, narrow and keel-like tubercles mesad of each shoulder, these tubercles becoming more numerous in going caudad, and in the middle region forming several irregular transverse series, the anterior of which extends mesad to the middle line or, on more caudal segments, to the submesal setigerous tubercle on each side. Tubercles present on all tergites to the twenty-sixth, the 27 to 29th tergites more simply longitudinally rugose over the posterior portion.

Length, 29 mm.; width, 3 mm.

Locality: Ky.: Pineville. One female taken July 10, 1947.

Differing from *carterensis* Bollman, in having the dorsal tubercles elongate, ridge-like and of variable size instead of rounded tubercles of nearly uniform size. Differing from *simulans* Loomis, a similarly large species, in the somewhat more numerous and more regularly arranged ocelli, in the more strongly compressed, ridge-like tubercles, and apparently in coloration.

PSEUDOTREMIA **FRACTA** Chamberlin, new species

Dorsum and antennae light brown or grayish brown; mesad of each shoulder the usual light mottled area. Legs pale.

Eyes pigmented; composed of about 10 ocelli, these arranged in three series parallel with the top of head, e.g., 4,4,2.

Tuberculation very strong; on a typical segment those on the posterior border are elevated beads of circular or oval outline, those on the anterior part are elongated and moderately compressed from side to side; tubercles present on all tergites from the second caudad, but those of the first ones few and confined to posterior area of tergite.

Width, 2.2 mm.

Locality: Tennessee: Gatlinburg Cove, A female taken June 24, 1924.

Characterized especially by the form and distinctness of the dorsal tubercles, the number of ocelli and the pigmentation.

Family Xystodesmidae

BORARIA **MONTICOLENS** Chamberlin, new species

A smaller species than *B. brunnior* Chamb. which occurs in the same general area. From that species it differs in the details of the gonopods. (Fig. 16) In these the principal blade is longer, more slender, and but moderately and evenly curved instead of being rather abruptly bent mesad as it is in *brunnior* and *geniculata*. On the other hand, the prefemoral spine is proportionately broader and shorter.

The type is brown above, with a band along posterior margin of tergites yellowish, and with a yellow spot also on most of the keels. Pleurae, venter, legs and antennae yellow.

Width, 3.8 mm.

Location: Tennessee: Great Smoky Mts. National Park. One male.

RECORDS OF AMERICAN MILLIPEDS AND CENTIPEDS COLLECTED BY DR. D. ELDEN BECK IN 1950

RALPH V. CHAMBERLIN
Emiritus Professor of Biology
University of Utah
Salt Lake City, Utah

In the course of field work carried out in various parts of the United States in 1950, Dr. D. Elden Beck, Brigham Young University, Provo, Utah, incidentally collected the millipeds and centipeds listed in the present paper. Included in the list, however, are a few forms taken during earlier years. The collection is of interest not only in embracing representatives of the four new species herein diagnosed, but also in adding important distributional data on previously known forms.

DIPLOPODA

Order POLYDESMIDA

Family Polydesmidae

POLYDESMUS COMPLANATUS Linne

New Jersey: Nutley, May 7, 1950, males and females.

A species introduced from Europe.

PSEUDOPOLYDESMUS SERRATUS (Say)

Maryland: Bethesda, November 4, 1949, two specimens; Vermont: Barre, June 10, 1950, one female.

DIXIDESMUS **PHANUS** Chamberlin, new species

A species most closely related to *D. conlatus* (Chamberlin) and *D. sylvicolens* Chamberlin. In size, it is much smaller than the former, its length being 18 mm. as against 22 mm. or more, and somewhat larger than the latter.

From both those species the present one differs in the details of the gonopods of the male, e.g. in having a terminal tooth set at right angles to the axis, in the arrangement of the teeth and setae on the terminal division, in the larger ectal process which extends farther caudad and overlaps the axillary spine, and in having the tooth on the mesal edge proximad of the level of the cushion abortive. The axillary seta or spine is characteristically geniculate near its base and arises much closer to the cushion than in the other species. See further Fig. 1.

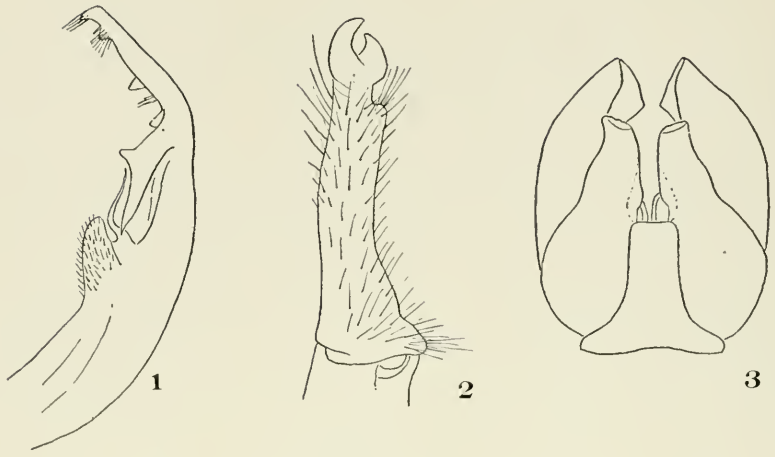

Fig. 1. *Dixidesmus phanus,* n. sp. Left gonopod of male, ectal aspect.
Fig. 2. *Auturus becki,* n. sp. Right gonopod of male, caudal aspect.
Fig. 3. *Nannolene corticolens,* n. sp. Gonopods of male, anterior aspect.

Locality: Florida, Suwannee River. Five specimens were taken on April 15, 1950. Type and paratypes in writer's collection, University of Utah.

Family Xystodesmidae

APHELORIA CORIACEA (Koch)

New York: Ithaca, June 13, 1950, male and female.

EPELORIA LEIACANTHA Chamberlin

Georgia: Ft. Benning, one male, which is larger in size than the types, taken April 16, 1950.

HARPAPHE sp.

California: Muir Woods National Monument, one female of uncertain species, August 10, 1950.

ZINARIA CALA Chamberlin

Florida: Suwannee River, one male, April 15, 1950.

Family Eurydesmidae

SEMIONELLUS PLACIDUS (Wood)

Georgia: Ft. Benning, four specimens, April 16, 1950.

Family Stiodesmidae

PSOCHODESMUS CRESCENTIS Cook

Florida: Archbold Biological Station at Lake Placid; several specimens, April 7, 1950.

Family Strongylosomidae

OXIDUS GRACILIS (C. Koch.)

North Carolina: Greensboro, several specimens, April 22, 1950.

An Asiatic species introduced and now widely established, especially familiar in greenhouses.

Family Euryuridae

AUTURUS **BECKI** Chamberlin, new species

Dorsum dark brown, with the usual median light spot on caudal border of each tergite, this spot very large and probably orange or yellow in life but now bleached out; a similar light spot on and adjacent to each keel. Legs yellow.

Last dorsal plate with sides parallel over middle part of length, and caudad of this a little converging to the rounded posterior corners; caudal margin slightly indented at middle.

The gonopods of male nearest in form to those of *A. georgianus* Chamberlin, but more robust; the outer distal lobe relatively more elongate, and more curved and pointed at the end instead of being widely rounded. See further, Fig. 2.

Length, 23 mm.; width, 2.8 mm.

Locality: Florida, Suwannee River, five specimens, April 15, 1950.

Type and paratypes in writer's collection, University of Utah.

Order JULIDA

Family Julidae

DIPLOIULUS HORTENSIS (Wood)

Vermont: Quechee (near Randolph), one specimen, June 9, 1950.

A species well established in the Eastern States but probably originally introduced from Europe where, in recent years, it has been most commonly known as *Cylindroiulus frisius* Verhoeff.

DIPLOIULUS CAERULEOCINCTUS (Wood)

New Jersey: Nutley, several, May 7, 1950; Vermont: Quechee, one female, June 9, 1950.

This species, abundant in the east, is an essentially synanthropic form which occurs commonly also in England and other parts of western Europe.

OPHYIULUS PILOSUS (Newport)

Virginia: Charlottesville, several specimens, April 26, 1950; Vermont: Quechee (near Randolph), one specimen, June 9, 1950.

Family Nemasomidae

NOPOIULUS MINUTUS (Brandt)

Utah: Salem, several specimens, April 15, 1949. Provo, one specimen, October 18, 1950.

A synanthropic species introduced from Europe.

Family Paraiulidae

TAIULUS TIGANUS (Chamberlin)

Utah: Springville, several, collected by V. J. Tipton, April 6, 1949, Canyon Glen at Provo Canyon, several specimens taken by D. Elden Beck, May 22, 1947.

Order LYSIOPETALIDA

Family Callipodidae

SPIROSTREPHON LACTARIUM (Say)

New York: Ithaca, one, June 19, 1940.

In addition immature specimens of this or a related form were taken at Lake Placid, Florida.

Order SPIROBOLIDA

Family Spirobolidae

SPIROBOLUS SPINIGERUS Wood

Florida: Archbold Biological Station at Lake Placid, several specimens, March 16, 1950, at Ocala, one female, April 13, 1950.

Order CAMBALIDA

Family Cambalidae

NANNOLENE **CORTICOLENS** Chamberlin, new species

Body conspicuously annulate, rings of dark brown to nearly black alternating with pale rings: last tergite dark brown with caudal border pale, this border variable in width. In specimens in full color the seriate dark spots along the sides are small or obscure, but these spots show distinctly in paler individuals. Legs and antennae yellow. The head pale across vertex, the color solid; a dark line between inner angles of eyes and the area below this a lighter dusky color down to the pale clypeus, the dusky area enclosing below level of antennae two darker, usually elongate spots above and below which are paler areas. Body entirely lacking the violaceous pigment giving name to *N. violacea*.

Ocelli mostly 18 to 20 in number.

Body having the usual beaded or moniliform appearance; moderately constricted behind collum in the female, more strongly so in the male. Last tergite long.

Appearing distinct from previously described forms in the details of the male gonopods; e.g., in the proportions of the anterior sternite, the form of the distal ends of the anterior coxae which widen proximad more gradually than in *violacea* and have their distal ends more decidedly truncate. For these and other details see Fig. 3.

Number of segments, mostly 54-55.

Length, up to 20 mm.

Locality: California, Marsh Creek Springs (near Concord) at north base of Mt. Diablo, several specimens of both sexes, August 14, 1950. Type and paratypes in writer's collection, University of Utah.

CHILOPODA

Order LITHOBIIDA

Family Lithobiidae

LITHOBIUS FORFICATUS (Linne)

Nevada: McGill, one male and two females, August 5, 1950; Nebraska: North Platte, two males, June 22, 1950; Vermont: Quechee (near Randolph), two males, June 9, 1950, Rutland, one male and two females, June 10, 1950, Barre, two males and one female, June 10, 1950; New York: Albany, a male and female, June 11, 1950;

New Jersey: Nutley, two males, May 7, 1950; Maryland: Bethesda, a male and female, November 4, 1949.

LITHOBIUS ATKINSONI Bollman

Georgia: Ft. Benning, a female, April 16, 1950.

NEOLITHOBIUS ETHOPUS Chamberlin

Florida: Gainsville, a male and female, April 14, 1950, Archbold Biological Station at Lake Placid, one male, April 7, 1950, Suwannee River (near Oldtown), two females, April 15, 1950.

NEOLITHOBIUS MORDAX (L. Koch)

Nebraska: Omaha, a male and female, June 20, 1950.

NEOLITHOBIUS TRANSMARINUS (L. Koch)

Louisiana: Camp Plauche (near New Orleans), four males and one female, January 24, 1944.

NEOLITHOBIUS UNDERWOODI (Bollman)

Georgia: Ft. Benning, a male and female, October 24, 1943.

NEOLITHOBIUS VORAX (Meinert)

Florida: Archbold Biological Station at Lake Placid, one female, March 11, 1950.

NEOLITHOBIUS XENOPUS (Bollman)

Georgia: Ft. Benning, one female, November 12, 1943.

This species, originally described in 1888 from a single male taken at Macon, Georgia, has not been since recorded until now. In addition to the specimen taken by Dr. Beck, there were found, in the course of the present study, nine additional specimens in the University of Utah collection that were taken at Gainsville, Florida in 1942 (Ivie, collector).

GARIBIUS GEORGIAE Chamberlin

Georgia: Ft. Benning, one female, November 20, 1943.

PAOBIUS VAGRANS Chamberlin

Vermont: Quechee (near Randolph), one female, June 9, 1950.

TAIYUBIUS HARRIETAE Chamberlin

Nevada: McGill, one male, August 5, 1940.

Previously known from Colorado.

Family Gosibiidae

GOSIBIUS SACCHAROGEUS Chamberlin

Louisiana: Camp Plauche (near New Orleans), a male and female, January 24, 1944.

Previously known only from Texas.

Order SCOLOPENDRIDA

Family Cryptopidae

CRYPTOPS HYALINUS (Say)

Georgia: Ft. Benning, two imperfect specimens, November 20, 1943.

OTOCRYPTOPS SEXSPINOSUS (Say)

New York: Ithaca, one specimen, June 13, 1950; North Carolina: Greensboro, several partly grown, April 22, 1950; Florida: Gainsville, two specimens, April 14, 1950; Archbold Biological Station at Lake Placid, two adults and one female with many young, March 5, 1950; California: Yosemite National Park, two specimens, August 17, 18, 1950; Muir Woods National Monument, several, August 10, 1950.

THEATOPS POSTICUS (Say)

Florida: Archbold Biological Station at Lake Placid, eight specimens taken April 7 and March 5-7, 1950; Gainsville, one, April 14, 1950.

Family Scolopendridae

SCOLOPENDRA VIRIDIS Say

Florida: Archbold Biological Station at Lake Placid, one, March 7, 1950.

SCOLOPENDRA POLYMORPHA Wood

Utah: Arches National Monument, two variant specimens, May 12, 1949.

SCOLOPENDRA PACHYGNATHA Pocock

Florida: Archbold Biological Station at Lake Placid, two, March 11, 1950.

Previously known only from Mexico (Zacatecas)

Odrer GEOPHILIDA

Family Chilenophilidae

ARCTOGEOPHILUS XENOPORUS (Chamberlin)

California: Yosemite National Park, one specimen, probably this species, taken August 17, 1950.

ARCTOGEOPHILUS UMBRATICUS (McNeill)

North Carolina: Greensboro, one specimen. April 22, 1950.

PACHYMERIUM FERRUGINEUM (C. L. Koch)

Nebraska: Omaha, two specimens, June 20, 1950.

Family Geophilidae

ARENOPHILUS BIPUNCTICEPS (Wood)

Georgia: Athens, two, April 19, 1950; Virginia: Charlottesville, one April 26, 1950; Louisiana: Camp Plauche (near New Orleans), four specimens, January 24, 1944; Nebraska: North Platte, one specimen, June 22, 1950, Omaha, one, June 20, 1950.

GEOPHILUS MORDAX Meinert

Florida: Kissimmee River, one, March 13, 1950, Archbold Biological Station at Lake Placid, one, March 5, 1950.

GEOPHILUS **BECKI** Chamberlin, new species

Color of preserved specimens in general orange yellow, the head and antennae darker orange or somewhat chestnut. Legs clear yellow.

Cephalic plate broad, with anterior and caudal ends truncate. Prebasal plate a little exposed at the middle. No definite clypeal foveolae. Median division of labrum large, bearing six stout, strongly sclerotized teeth which are distally blunt or subtruncate (at least in the specimen dissected); lateral pieces with long pectinae. First maxillae each with two long membraneous lappets.

Basal plate broadly trapeziform, wider posteriorly than the head. Claws of prehensors when closed reaching nearly to the end of the first antennal joint; claws with an obscure nodule at base within, the outer joints unarmed. Chitinous lines fine, incomplete.

Dorsal plates deeply bisulcate.

First spiracle largest, slightly elliptic, the others circular.

Anterior sternites with a shallow median depression crossed by a median longitudinal furrows which does not extend upon either anterior or posterior border. Ventral pores not detected.

Tergite of last pedifierous segment broader than long, its caudal margin mesally straight and as long as the anterior.

Last ventral plate also wider than long, narrowing moderately from the middle caudid, but the caudal margin long and nearly straight; lateral margins convex. Coxal pores about a dozen on each side, arranged along and beneath the border of the sternite.

Anal legs of moderate length, bearing claws.

Genital segment subdensely hairy, the hairs short and erect, anal pores present.

Pairs of legs in the female, 61-63.

Length, about 50 mm.

LOCALITY: California, Cabrillo Beach near San Pedro. Three adult females and two young specimens taken August 22, 1950. Specimens found under rocks and kelp at ocean water's edge. Type and paratypes in writer's collection, University of Utah.

This species resembles rather closely *G. nicolanus* Chamberlin, known only from San Nicolas, Id., but distinct in the presence of anal pores, in having the last tergite caudally truncate instead of strongly convex, in the presence of the nodule or denticle at the base of the claws of the prehensors.

Family LINOTAENIIDAE

LINOTAENIA CHIONOPHILA (Wood)

California: Yosemite National Park, two specimens, August 17, 1950.

LINOTAENIA LAEVIPES (Wood)

California: Mill Valley, one, August 10, 1950.

Family SCHENDYLIDAE

SCHENDYLA NEMORENSIS (Kock)

Utah: Lehi, one female, April 22, 1949.

A species probably introduced from Europe but now widespread in cultivated areas of the United States and Canada, especially in the eastern and central states.

NEW NEOTROPICAL WATER-STRIDERS (Hemiptera-Veliidae)

CARL J. DRAKE
Ames, Iowa

This paper is based upon material in the U. S. National Museum and the private collection of the author. It includes the description of one new species from Costa Rica and three from the West Indies. Notes are also given on some new synonymy, and a new name is proposed for a preoccupied one. Unless otherwise stated under the description, the types are in the collection of the author. The units of measure may be converted into millimeters by dividing by 80.

MICROVELIA SIGNATA Uhler

Microvelia signata Uhler, Proc. Cal. Acad. Sci., Ser. 2,4:288. 1894.
Microvelia setipes Champion, Biol. Centr. Amer., Rhynch., 2:130, Pl. 8, fig. 19. 1898 (N. sym.)
Microvelia oreades Drake and Harris, Ohio Jr. Sci., 28(5):274. 1928 (N. syn.).

M. setipes champion and *M. oreades* Drake and Harris are both apterous forms of *M. signata* Uhler, and are here suppressed as synonyms of the latter. Several hundred specimens (apterous and macropterous) have been examined from United States (Calif., Ariz., N. Mex. and Utah) and Mexico. The type of *M. signata* was taken in Lower California. The apterous form vary considerable in size.

MICROVELIA INTONSA, new name

Microvelia crinata Drake, Proc. Biol. Soc., Wash., 64:76. 1951.

As a result of a typographical error, which I failed to correct in manuscript and proof, the name "*crinata*" was wrongly used for "*crinita.*" As *M. crinita* (Hoberlandt, DIAMANTER DE ANGOLA, MUSEU DO DUNDO, *p.* 36. *figs.* 103-113, 1950) is preoccupied, the name *intonsa* is here proposed for *M. crinata* Drake. The extremely long hairs on the legs separate *intonsa* from all of the described species of American *Microvelia* Westwood.

MICROVELIA **OAXACANA** Drake, n. sp.

Apterous forms: Elongate, moderately broad, dark brown-fuscous with a few small bluish spots on abdomen; body beneath dark fuscous-brown with bluish tinge, the venter sometimes mostly brownish.

Size: Length, 2.00-2.20 mm.; width, 0.75 mm.

Head: Width across eyes, 0.62 mm. Convex with media line distinct, a small patch of long brown hairs behind each eye; rostrum

yellowish brown with terminal segment dark fuscous. Antennae long, slender, dark brown with basal segment paler, shortly pilose with a few slightly longer hairs on last three segments; segment 1 moderately stout, a little bowed, stouter than two; III and IV long, slender, equal in thickness; formula—I, 22; II, 15; III, 32; IV, 32.

Thorax: Pronotum very large, covering rest of thorax, pitted, wider than long (55:34), slowly broadly rounded behind, moderately clothed with very short yellowish pubescence. Legs long, slender, clothed with short hairs, the basal part of femora above, entire coxae and trochanters and all of femora beneath pale. Hind femora scarcely thicker than middle pair, without spines.

Abdomen: Length, 1.28 mm. Pubescence slightly longer than on pronotum. Posterior part of each connexival segment and last tergite testaceous; connexiva beneath testaceous. Female with last tergite scarcely longer than preceding segment, with moderately long hairs on hind margin; last ventrite distinctly longer than the preceding segment.

Male: Last tergite nearly one-half longer than the preceding segment; last ventrite also longer than the preceding segment. Genital segments very large, above densly clothed with rather short brown hairs, with lateral sides rounded; first genital segment beneath deeply widely roundly excavated leaving only a short base; second segment large, wide, without lateral spines. Venter without tubercle.

Type: (male), Oaxaca, Mex., intercepted on Bromeliaceous plant, by federal quarantine plant inspectors, New York City, New York, March 27, 1937. *Allotype* (female), and 3 *paratypes*, Ciudad Victoria, Mexico, intercepted on long moss *(Tillandsia)*, by federal plant inspectors at Loredo, Texas, March 20, 1945. Winged from unknown. *Type* in U.S. National Museum.

This species is about the same size as *M. albonotata* Champ., but lacks the large ventrite spine and has much larger and longer pronotum, which conceals the entire thorax in the apterous form as in *M. austrina* Bueno, *M. hidalgoi* McKinstry and *M. costaiana* Drake.

MICROVELIA **TATEIANA** Drake, n. sp.

Apterous form: Moderately large, elongate, testaceous or brownish with second to sixth visible tergites dark fuscous. Head testaceous or brownish with two broad testaceous stripes on each side of media line uniting posteriorly. Tergites with some bluish

areas. Sides of head and pronotum behind eyes with silvery pubescence.

Size: Length, 1.90-2.10 mm.; width, 0.75 mm.

Head: Width across eyes, 0.56 mm. Median line distinct, but not conspicuous, sometimes indistinct posteriorly. Rostum pale testaceous with apical segment black-fuscous. Antennae long, slender, brown-fuscous with base testaceous, shortly pilose with very few slightly longer hairs; segment I moderately stout, a little bowed, mostly testaceous; II much slenderer, a little thicker than next two; III and IV slender; formula—I, 20; II, 14; III, 27; IV, 30.

Thorax: Pronotum rather large, covering most of mesonotum, more than twice as wide as long (50:19), pitted with pits arranged largely in two transverse rows; mesonotum pale testaceous, with exposed part approximately one-half as long as pronotum. Legs long, slender, clothed with short pale hairs, testaceous with apical half of femora and entire dorsal surface of tibiae brown to dark brown; tarsi fuscous, segment one and two of both middle and hind legs practically equal in length. Hind femora unarmed in male, slightly stouter than middle pair.

Abdomen: Length, 1.15 mm. Dorsal surface of both abdomen and pronotum with a few scattered long fine hairs, not nearly as hairy as in *M. portoricensis*. Connexiva testaceous with the outer margin and sutures between segments fuscous, wider in male than in female, strongly reflexed apically in female. Last three tergites flavous with slight bluish bloom. Abdomen beneath testaceous to dark fuscous with some bluish plumbeous, clothed with pubescence and some short hairs; last ventrite in female narrowed posteriorly, long, less than twice the length of preceding segment.

Male: Last ventrite about one-fourth longer than preceding segment, not as strongly narrowed posteriorly as in female; first genital segment very large, beneath very widely deeply roundly excavated behind leaving only a short smooth base; second segment very wide, distinctly asymmetrical, strongly widely produced laterally on left side, and on other side behind with a transverse, somewhat cylindrical protuberence. Venter without tubercle. Femora unarmed. Second genital segment without lateral spines.

Macropterous form: Pronotum brownish with a narrow transverse band near front margin and a broad stripe extending on median line from anterior margin posteriorly to beyond the disc, wider than long, deeply pitted with pits arranged largely in two transverse rows,

transversly convex on disc: humeral angles prominent. Hemelytra covering apex of abdomen, brown with small basal area and two or three indistinct spots beyond the middle pale, without silvery white spots in cells; veins distinct, not prominent. Length, 2.15 mm., 0.90 mm.

Type: (apterous male), *allotype (apterous female)* and 17 apterous and one macropterous paratypes, Maricao, Porto Rico, H. D. Tate. Named in honor of Dr. Tate, who has collected numerous water-striders for me in Porto Rico.

The asymmetrical male genitalia is very striking and peculiar to this species. The hairs on the antennae are not nearly as long nor as numerous and the vesture on dorsal surface not as shaggy as in *M. portoricensis*. The male genital segments of the latter species are small. The lack of silvery white markings in the cells of the hemelytra also serve to separate *M. tateiana* from other species of similar size and appearance in Insular and Central America.

MICROVELIA **PORTORICENSIS** Drake, n. sp.

Apterous form: Moderately large, testaceous to brownish with silvery hairs on side of head and fore part of pronotum behind eyes. Abdomen above largely fuscous with last three tergites flavous or bluish flavous and a quadrate spot on each side of second and third visible tergites; beneath dark fuscous with a bluish bloom, the venter becoming brownish tesaceous apically; sometimes venter largely testaceous; underside of connexiva testaceous. Length, 1.90-2.10 mm. width, 0.75 mm.

Head: Width across eyes, 0.51 mm. Testaceous or dark brown with two broad testaceous stripes on each side of median line coalescing behind eyes. Median line not very distinct posteriorly. Rostrum testaceous with last segment piceous. Antennae moderately long, slender, brown with basal part of first segment testaceous, shortly pilose with long hairs on last three segments; segment I stout, slightly bowed; II slender, quite slender at base; III and IV slender; formula—I, 14; II, 12; III, 20; IV, 23. Head testaceous beneath.

Thorax: Pronotum large, produced posteriorly, covering a little more than half of mesonotum, more than twice as wide as long (55:21), the hind margin feebly concave. Entire dorsal surface of thorax and abdomen sparsly covered with long brownish hairs. Legs moderately long, dark brown or fuscous, clothed with short hairs, the coxae, trochanters, base of femora above and most of femora beneath testaceous. Hind femora a little stouter than middle pair, un-

armed. Tibiae of middle and hind legs with rather long dark hairs on outer surface. First tarsal segment of middle and hind legs feebly longer than second.

Abdomen: Length, 1.35 mm. Connexiva a little wider and more arched in female, not reflexed posteriorly. Last tergite of female with several long hairs on hind margin. Male genital segments moderately large, brownish, hairy above; first segment beneath rather broad, smooth, widely deeply roundly excavated behind leaving only a short smooth base; second segment small, without lateral spines. Venter without tubercle.

Macropterous form: Length, 1.9 mm.; width, 0.92 mm. Pronotum dark velvety rufo-fuscous with a transverse band near anterior margin and a median basal stripe orange-yellow, clothed with short, yellowish pubescence; humeral angles prominent. Abdomen distinctly narrowed posteriorly. Hemelytra covering apex of abdomen, dark brown-fuscous with silvery white markings in cells (two long basal stripes, three or four median spots and median subapical spot silvery white). Other characters as in wingless form.

Type: (macroperous male) and *allotype* (macropterous, female). Mayaguez, Porto Rico, April 4, 1936, H. D. Tate. Paratypes: 26 specimens, taken with type; 1 specimen, Laiza, P.R., March 31, 1930; 1 specimen, Maricao, P.R., May 10, 1936, H. D. Tate; 2 specimens, Mayaguez, P.R., May 28, 1937, Pedro Lopez.

Distinguishable from *M. albonotata* Champion by the long hairs on antennae and shorter last antennal segment; male genital segments much smaller, the venter without tubercle. The long antennal hairs and abdomen (narrowed posteriorly) also separate it from *M. peruviensis* McKinstry. *M. tateiana* n. sp. has very different second genital segment in the male. All four of the above species have similar markings on the pronotum. *M. tateiana* is the only one of the four without silvery white marks on the hemelytra.

MICROVELIA **CUBANA** Drake, n. sp.

Apterous form: Moderately large, testaceous or brownish testaceous with some fuscous areas and a few bluish patches on abdomen; sided of head behind eyes and pronotum in front with silvery pubescence or short silvery hairs; a quadrate spot on each side of second, third and fourth visible tergites and usually last three tergites bluish; body beneath testaceous or brownish with bluish bloom, the sides of abdomen darker.

Size: Length, 1.80-2.10 mm., width, 0.80-0.90 mm.

Head: Width across eyes, 0.50 mm. Dark brown with a broad or brownish stripe on each side of median line coalescing behind eyes. Rostrum testaceous with last segment piceous. Antennae long, slender, brown or fuscous brown, shortly pilose, without long hairs; formula—I, 14; II, 11; III, 16; IV, 26.

Thorax: Pronotum testaceous, with a narrow part in front of transverse row of pits raised and usually darkened towards the sides, produced posteriorly covering more than half of mesonotum, twice as wide as long (50:22), the posterior margin feebly concave; mesonotum testaceous, the exposed part nearly half as long as pronotum. Legs rather long, slender, dark brown or fuscous with coxae, trochanters, base of femora above (most of dorsal surface on anterior femora) and entire ventral surface of femora testaceous. Hind femora scarcely thicker than middle pair, unarmed in both sexes.

Abdomen: Length, 1.25 mm. Color somewhat variable, often with a few basal segments darkened; connexiva testaceous with outer margin and sutures between segment fuscous, wider in female than male, not reflexed behind middle. Dorsal surface of both thorax and abdomen without long hairs.

Male: Venter without tubercle. Last tergite and ventrite distinctly longer than the preceding segment. Femora without spines. Genital segments moderately broad, brown, with short hairs on dorsal surface, beneath testaceous; first segment beneath broadly deeply widely excavated so as to leave only a small smooth basal part.

Macropterous form: Length, 1.90-2.20 mm.; width, 0.88 mm. Pronotum dark rufo-fuscous with a transverse band near front margin and a short median stripe in front orange-yellow, clothed with short yellowish pubescence and some silvery pubescence, the median ridge fairly distinct; humeral angles moderately prominent. Hemelytra brown-fuscous with silvery white spots in the cells (two longitudinal basal stripes, three spots nearly middle and a subapical ovate spot silvery white; veins distinct, not conspicuous.

Type: (apterous male), *allotype* (apterous female) and 22 *paratypes* (winged and wingless specimens), Havana, Cuba, Feb. 24, 1941, S. C. Bruner. Paratypes: 5 specimens, Baracoa, Cuba, Sept., 1901, U.S. Nat. Museum.

This pretty little species is closely allied to *M. portoricensis* Drake, but lacks the extremely long hairs on the last three antennal segments and the dorsal surface is also without long hairs. The broad asymmetrical second genital of male segment of *M. tateiana* Drake distinguishes it at once from both of the above species.

STRIDULATORY ORGANS IN SALDIDAE (HEMIPTERA)

By C. J. Drake and F. C. Hottes

In the course of clearing and mounting different parts of the body of various species of Saldidae for morphological study, it was noted under the compound microscope, that the anterior end, on each side, of the second visible connexival segment of the male bears a series of either 'peg-like" or "spine-like" organs. These peculiar structures appear to be stridulatory in function. Hitherto, stridulatory structures seem to have been entirely overlooked in the family. Sound-producing organs have not been found in female specimens.

The present paper presents a preliminary account of the stridulatory organs in shore bugs of the family Saldidae; it also calls attention to peculiar modifications of the hemelytral vein and metapleuron for holding the wings rigid in a resting position.

The authors are indebted to Mrs. E. H. Froeschner for making the drawings.

Morphological examinations have been made of more than 100 species of saldids from widely separated regions of the world. Stridulatory pegs or spines have been found in the males of all species studied in the following genera: *Saldula* Van Duzee, *Salda* Fabricius, *Calacanthia* Reuter, *Chiloxanthus* Reuter, *Chartoscirta* Stal, *Halosalda* Reuter. *Ioscytus* Reuter. *Lampracanthia* Reuter, *Micracanthia* Reuter, *Teloleuca* Reuter *Pentacora* Reuter and *Saldoida* Osborn. As only a single example of the old world genus *Omania* Horvath was available for study, it was not dissected. The rare genus *Orthophyrus* Horvath is unknown to the authors. In two species examined of the shore bug family Leptopodidae, no stridulatory structures were found.

Two other singular structures also seem peculiar to saldids. Near the base, on the underside, of each hemelytron, in both males and females, the median vein is suddenly enlarged and then deeply obliquely notched (fig. 1, *e* and *f*. and fig. 2 *a*) at the middle of the abruptly thickened part. This notch was found to be present in both hemelytra of the genera studied as listed under the foregoing paragraph. In addition, the pleura of the metathorax bear a small raised roughened area in line with the respective hemelytral notch. This raised "bump" and the notch working together serve to hold the hemelytra in a more rigid and stable position when the insect is not in flight.

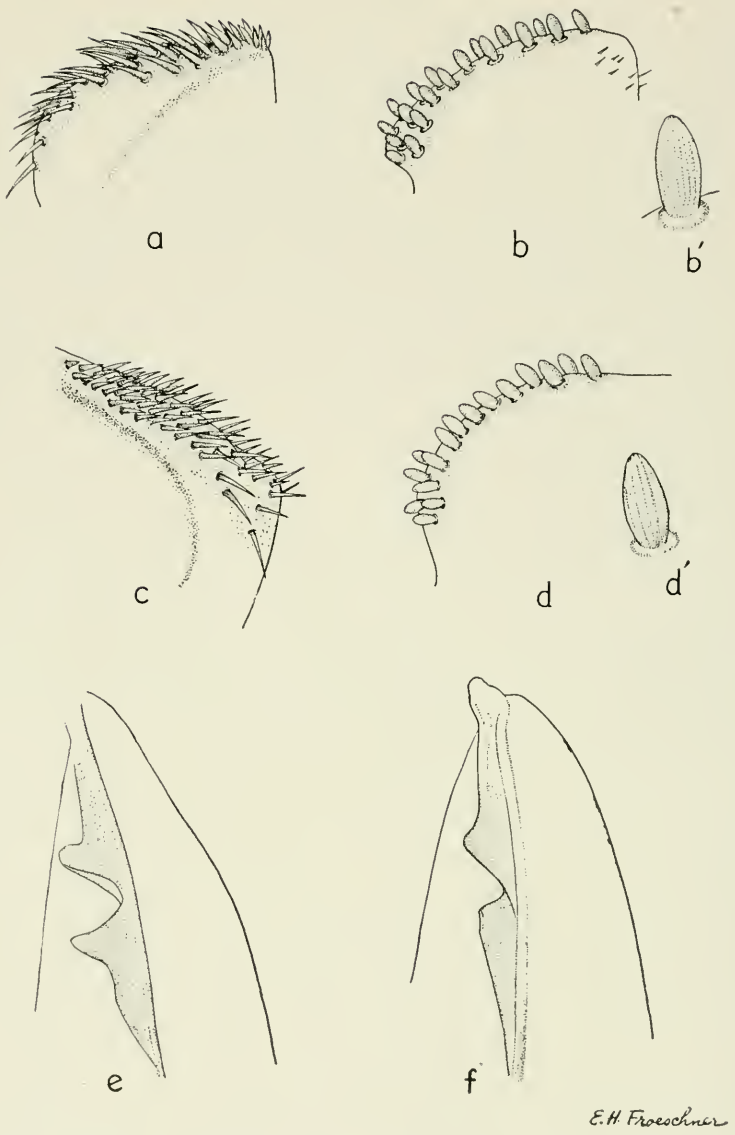

Fig. 1. Stridulatory organs of male Saldidae: *a*, left connexival segment of *Chiloxanthus pilosus* (Fallen); *b* and *b*[1], left connexival segment and enlarged peg of *Micrancanthia humilis* (Say); *c*, right connexival segment of *Chiloxanthus stellata* (Curtis); *d*, left connexival segment of *Saldula balli* Drake; *e*, Under side of hemelytron showing large subbasal notch in mid-vein; *f*, *Pentacora signoreti* (Guerin) showing subbasal hemelytron notch on underside of mid-vein near the base.

These structures which are present in both sexes do not appear to be stridulatory in function.

The stridulatory organs are arranged in one or more transverse rows, which curve convexly with the upper part of the front surface of the second visible connexival segment (fig. 1, *b*, and *d*, and fig. 2, *b.)* In general characterized by stridulatory spines, these structures are longer, more numerous and placed in more rows than in genera

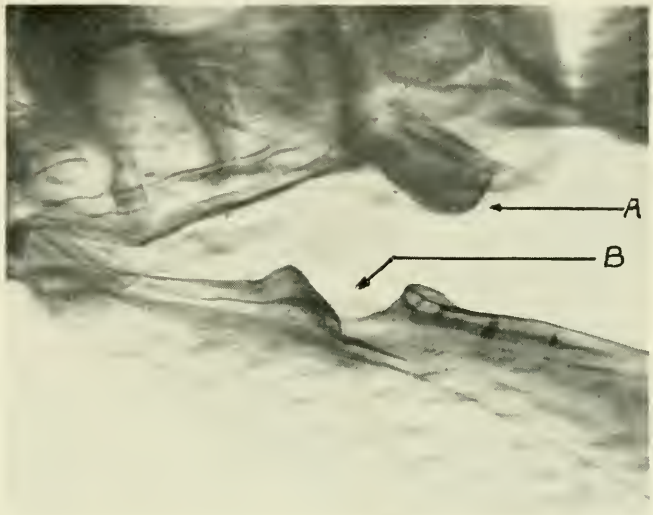

Fig. 2. *a* Under side of hemelytron showing *a* the lateral projection on the metathorax, *b* the subbasal notch in mid-vein, *Pentacora signoreti* (Guerin).

characterized by pegs (fig. 1. *a* and *c.*) As may be observed in the illustrations, both spines and pegs are placed horizontally, directed anteriorly; and, normally tilted somewhat inwardly.

Within a genus, there is a tendency towards a uniform pattern in arrangement, size and shape of both pegs and spines. In such genera as *Chiloxanthus*, *Pentacora* and *Salda*, the connexival stridulatory organs exhibit rather marked generic differences.

The manner in which the stridulatory organs function in nature has not been observed. The posterior margin of the preceding connexival segment is hardened and plate-like with a roughened surface. This probably functions as a rasping organ in conjunction with the pegs or spines. The connexival segments are capable of limited movement.

Fig. 2 *b* Left connexival segment of *Saldula andrei* Drake.

The pegs (fig. 1, *b* and *d*) may be arranged in one or two rows for part of the way, and then an additional row for part, or even the remainder of the distance. Generally speaking, the pegs are alternately arranged in the rows as alternateness in parallel rows places them closer together than oppositeness.

Occasionally, however, some of the pegs may be found opposite each other in the rows, and slight variation in size and arrangement occur within a species, even on opposite sides of the same specimen. As a rule, the pegs nearer the outer margin of the row are shorter, and blunter than those within. Sometimes the inner most pegs are followed by a few stiff spine-like hairs. As a rule the inner most spines or pegs are more tilted inwardly, but remain in a horizontal position. As the spines are more numerous than pegs, they exhibit greater variation in size and especially numbers, (fig. 1. *a*, and *c*) within a species. It is often difficult to count the spines, on account of numbers and arrangement. Under the oil emersion lens, the surface of the spines appears smooth, whereas the surface of the pegs is longitudinally striated (fig. 1. b^1 and d^1).

NOTES ON SOME CICINDELIDAE OF THE WESTERN UNITED STATES AND THE SOUTH PACIFIC ISLANDS WITH A DESCRIPTION OF A NEW SPECIES. (1)

VASCO M. TANNER
Professor of Zoology and Entomology
Brigham Young University

These notes are based chiefly upon specimens which have been collected in summer field work, during the past twenty years. Many days have been spent in Utah and neighboring states collecting insects and cold-blooded vertebrates during these years. We have also received a number of interesting species of tiger-beetles from former students who have collected on many of the South Pacific Islands. With this collection as a basis, I am pleased to make the following additions to my list of the Cicindelids from Utah which was published in 1929[2]. At that time I reported 40 species for Utah. In this paper six species are added to this state list. I wish to thank all those who have contributed specimens to our Coleoptera collection.

AMBLYCHEILA **UTAHENSIS** Tanner, n. sp.

Form elongate-oval; head as wide as the adjoining prothorax which becomes narrower posteriorly, being 5.5 mm. in width at anterior and 4 mm. at posterior; head and prothorax glabrous and shinny, except for a few punctures with black setae above the clypeal suture; labrum with two blunt median teeth, margin with nine deep punctures each bearing a long golden colored seta; each elytron with three distinct carinae, the interval between the first carina and the suture is as wide as the next two intervals combined. There are a few scattered punctures with decumbent setae on the intervals; carinae end about one fifth from the apex; apex very sparsely punctured; the eleven segments of the antenna are a dull brownish in color with scattered black setae; the antenna extends back to the middle of the elytra. Legs black except the base of the femur and trochanter which are brownish, slender, and thickly covered with black setae; under side of body with a few scattered setae. Length of head and body 22 mm.

Type: A perfect male specimen.

(1) Contribution No. 126 from the department of Zoology and Entomology, Brigham Young University, Provo, Utah.
(2) Vasco M. Tanner. The Coleoptera of Utah—Cicindelidae. The Pan-Pacific Entomologist. Vol. VI, No. 2, October, 1929, pp. 78-87.

Type locality: Diamond Valley, 15 miles north of St. George, Washington County, Utah. Collected in April, 1951 by one of Professor Arthur Bruhn's entomology students, Richard Schmutz. Professor Bruhn of the Dixie College at St. George has collected many interesting insects in that area.

Comparisons: On July 27, 1951 I had the opportunity of comcaring the type of *utahensis* with male and female specimens of *A. schwarzi* W. Horn in the California Academy of Science's Entomological Collection. In *utahensis* the thorax is one-fourth narrower than in male specimens of *schwarzi*. The head is also narrower, in fact, *utahensis* is smaller throughout than *schwarzi* specimens with which I compared it. The punctation on the upper part of the head in *schwarzi* is more dense and deep. The color of the coxal areas and the mouthparts in *schwarzi* is reddish. *schwarzi* is a more robust species.

I wish to thank Dr. Edwin C. Van Dyke for his kindness and opinion on the status of this proposed new species of Amblycheila.

In 1929 I reported that Mr. Warren Knaus had informed me that Mr. George P. Englehardt and Mr. Jacob Doll had collected, in 1917, two dead specimens of an Amblycheila in a pool in Ash Creek near Bellevue, Washington County, Utah, and that there were believed to be specimens of *schwarzi*. Just how carefully these specimens were studied and compared with *schwarzi* specimens is not known to me. It is my surmise, however, that they are similar to the specimen I am designating as *utahensis*. The two localities from which these specimens were collected is separated by a distance of about sixty miles. The two specimens of *schwarzi*, which I recently studied, in the California Academy of Sciences, are from Skidoo, Inyo, Co., California, collected by J. R. Slevin on May 14, 1931. If they are correctly determined and are *schwarzi* then the specimen described as *utahensis* in this report is distinct enough to be recognized as a new species.

CICINDELA FORMOSA subsp. LUXURIOSA Csy.

Southeast of Colorado Springs, Colorado, August 17, 1924 (A. G. Vestal)

A single male specimen collected in a "blow out" south and east of Colorado Springs by Dr. Vestal was given to the writer in 1925. I have compared it with Col. Casey's type and believe it is distinct enough in fineness of markings, size, and color to be recognized as a sub-species of *formosa*. It is a richly colored sub-species.

CININDELA LIMBALIS Klug

Island Park, Fremont County, Idaho, August, 1931. (Vasco M. Tanner)

A single specimen of this species was taken in the forest along the highway. It is a male and much smaller than a female from Chicago, Illinois, with which I have compared it.

CICINDELA LIMBALIS subsp. AUGURALIS Csy.

Warner Ranger Station, La Sal Mountains, Grand County, Utah, July, 1934. (Vasco M. Tanner); Bryce Canyon National Park, Garfield County, Utah, August, 1933. (Vasco M. Tanner); The pass, Table Cliff Mountain, Garfield County, Utah. Elevation 9,300 feet, June, 1936. (Vasco M. Tanner). Aquarious Plateau, Garfield County, Utah, June, 1938. (Wilmer W. Tanner).

These specimens, 2 ♀ and 1 ♂, were taken at an elevation of 9,000 feet. I have compared them with Col. Casey's type specimen now in the National Museum. I am in agreement with Nicolay and Weiss 1932 that *auguralis* is a sub-species of *limbalis* and not of *purpurea*.

CICINDELA REPANDA subsp. HUDSONICA Csy.

Island Park, Fremont County, Idaho, August, 1931. (Vasco M. Tanner)

This is a single male specimen I have compared with Casey's type. It agrees almost perfectly in structure and color with the type which is a female specimen. I am considering it a sub-species of *repanda* since it has more features of this species than of *duodecimguttata*. I think it is distinct enough to be removed from synonymy.

CICINDELA LONGILABRIS subsp. OSLARI Leng

Logan Canyon, Tony's Ranger Station, Cache County, Utah, June, 1926. (Clarence Cottam); Uintah Mountains, Tryol Lake, July, 1930. (Truman Swallow, C. L. Hayward and John C. Fechser).

This high mountain form of *longilabris* is common in the Uintah Mountains of Utah. The specimens reported here have been compared with specimens of *oslari* in the Casey Collection, United States National Museum and the California Academy of Sciences. They are distinct enough from *longilabris* varities to be considered as a separate sub-species.

CICINDELA CARTHAGENA subsp. PACIFICA Schp.

Las Vegas, Clark Co., Nevada; June 5, 1905 (Tom Spalding)

Five specimens are in the collection which were collected by Tom Spalding on the grassy area north and west of the town of Las Vegas.

CICINDELA SPERATA subsp. RUBICUNDA (E. H. Harris)

Caineville, Wayne Co., Utah, 1928 (Vasco M. Tanner); Escalante, Garfield Co., Utah, August, 1939 (Harry P. Chandler); Arches National Monument, Grand Co., Utah, August, 1950. (Dorald Allred)

This is a brilliant distinctive form of the *sperata* complex. Seventeen specimens are in the collection.

CICINDELA LEPIDA Dej.

Delta, Millard County, Utah, August, 1949 (Dorald Allred)

This is the first record we have of this species occurance in Utah. Mr. Allred reports that he collected the four specimens, now in the collection, at night on the sand dunes north of Delta.

CICINDELA LIMBIGERA subsp. NYMPHA Csy.

Kanab, Kane Co., Utah, May, 1951 (D. E. Beck)

I have compared the single specimen taken by Dr. Beck with several specimens of this sub-species in the California Academy of Science's Collection, which were collected by Mr. Norman Criddle at Aweme, Manatoba. This new record for Utah greatly extends the distribution of this sub-species. It was collected on the sand dunes to the west and north of Kanab.

CICINDELIDAE FROM THE PACIFIC ISLANDS.

The following Pacific Island Cicindelids were recently added to the Brigham Young University collection. These have been studied by the writer and compared with materials in the United States National Museum and the California Academy of Sciences.

TRICONDYLA APTERA Olivier

Solomon Islands, Guadalcanal, Tenaru River area, June and July, 1944, (D. Elden Beck) and (Ernest Reimschiissel). Fifty-five specimens are in this collection.

Admiralty Islands, Los Negros, September, 1944, (Ernest Reimschiissel.). Thirty-six specimens are in this collection.

Dr. Beck reports that he collected this species on the leaves and ground cover of the jungle forest. It was fairly common.

TRICONDYLA APTERA subsp.

Philippine Islands, Luzon, Camp near Manila, May, 1945, (Ernest Reimschiissel); Leyte Island; Tacloban, March, 1945, (Ernest Reimschiissel).

COLLYRIS ALBITARSIS Erichs.

Philippine Islands, Luzon, Camp near Manila, May, 1945, (Ernest Reimschiissel).

COLLYRIS SIMILIOR W. Horn

Philippine Islands, Luzon, Camp near Manila, May, 1945, (Ernest Reimschiissel).

COLLYRIS ACROLIA Chaud.

Philippine Islands, Luzon, Camp near Manila, May, 1945, (Ernest Reimschiissel).

COLLYRIS sp.

Philippine Islands, Leyte Island, Tacloban, March, 1945, (Ernest Reimschiissel).

THERATES LABIATUS Fabricius

Solomon Islands, Guadalcanal, June and August, 1944, (D. Elden Beck), (Ernest Reimschiissel); Admiralty Islands, Los Negros, Sept., 1944, (Ernest Reimschiissel).

THERATES BASALIS variety SIMPLO-FLAVESCENS W. Horn

Solomon Islands, Guadalcanal, June, 1944, (D. Elden Beck), (Ernest Reimschiissel); Admiralty Islands, Los Negros, September, 1944, (Ernest Reimschiissel).

CICINDELA DECEMGUTTATA subsp. SANGUINEO-MACULATA Blanchard

Solomon Islands, Guadalcanal, July, 1944, (Ernest Reimschiissel), (Doyle Taylor), (D. Elden Beck).

Sixty-eight specimens are in the collection.

CICINDELA DISCRETA Schaum

Solomon Islands, Guadalcanal ,five specimens collected Aug., 1944, (D. Elden Beck).

ERRATUM PAGE

We regret that a portion of a key in Professor La River's recent paper was left out. We are pleased to include this missing portion of the key.

La River's statement concerning this matter follows:

"Due to the author's absence from the country while his recent paper "The Staphylinoid and Dascilloid aquatic Coleoptera of the Nevada Area" (Great Basin Naturalist 10, 1-4:66-70) was being set in type, he had no opportunity to examine a galley proof. Subsequently it was noticed that the second page of the original manuscript, containing the final part of the key to hydraenid genera and the initial portion of the key to the species of *Limnebius* (one of those genera), had been inadvertently omitted."

'The following keys represent this missing portion, and are to be placed in the key to hydraenid adults on the first page of the cited paper, between the two "2's" in the couplets following "(Limnebius)" on the right hand side of the page."—Ira La Rivers.

2. Maxillary palpi very long, much longer than antennae; pronotum coarsely, closely punctate, sides without a transparent border ..... (Hydraena)
——Maxillary palpi shorter than antennae; pronotum variously sculptured, often with deep fossae and grooves, always with a transparent border in at least basal half ..... OCHTHEBIUS

LARVAE

1. Antennae usually shorter, with no prominent inner swellings; setae on clypeus not placed at anterior margin and two median ones distant from each other; *lacinia mobilis* narrower; inner lobe of maxillae not distinctly divided apically; cerci nearly contiguous proximally and divergent ..... OCHTHEBIUS
—— Antennae usually longer, with prominent inner swellings; setae on clypeus placed at anterior margin and equidistant; *lacinia mobilis* broader; inner maxillary lobe distinctly divided apically; cerci widely separated proximally and nearly parallel 2
2. Third antennal segment without inner swellings, segment two with a single antennal appendage; pair of pectinate setae at anterior margin of labrum; inner maxillary lobe slightly divided apically; labium broadened distally (Hydraena)
——Third antennal segment with an inner swelling; second segment with two slender antennal appendages; no pectinate setae at anterior labral margin; inner maxillary lobe strongly divided; labium not noticeably broadened distally, although mental sides rounded ..... (Limnebius)

(*Limnebius* Leach 1815)

1. Surface more-or-less polished ..... (*piceus* (Horn) 1872)

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PACIFIC ISLANDS HERPETOLOGY, NO. V GUADALCANAL, SOLOMON ISLANDS: A CHECK LIST OF SPECIES (1)

VASCO M. TANNER
Professor of Zoology and Entomology
Brigham Young University
Provo, Utah

INTRODUCTION

This paper, the fifth in the series, deals with the amphibians and reptiles, collected by United States Military personnel while they were stationed on several of the Solomon Islands.

These islands, which were under the British Protectorate at the out-break of the Japanese War in 1941, extend for about 800 miles in a southeast direction from the Bismarck Archipelago. They lie south of the equator, between 5° 24′ and 10° 10′ south longitude and 154° 38′ and 161° 20′ east longitude, which is well within the tropical zone.

In this study, eleven large islands are considered as composing the Solomon Archipelago, which form two chains. The northern row of islands consists of Buka and Bougainville, just south of New Britain. Next is Choiseul, followed by Isabel and Malaita. The southern group, which practically parallels the northern row, consists of Vella Lavella, Kolombangara, New Georgia, Russell, Guadalcanal and San Cristobal.

Bougainville is the largest island of the group. It has a surface area of 3,900 square miles, the highest mountain peak, Mount Bally, 10,000 feet and also active volcanoes. Guadalcanal, 2,500 square miles, is the largest island in the southern row with a peak over 8,000 feet high (see map fig. 1).

(1) Contribution No. 127 from the Department of Zoology and Entomology, Brigham Young University.

GUADALCANAL ISLAND
N
RUA SURA ISLANDS
NURA I.
BEAGLE I.
MALAITA I.
KOMACHO
PAPASULI
GOMBUA
BEANDE
BEANDE PT.
KELI PT.
LUNGA
KONUMBONA
MALAGETI
KUMA PT.
POLOLA PT.
CAPE HUNTER
CAPE ESPERANCE
BEAUFORT BAY
CAPE BEAUFORT
ADOLPHUS PT.
CAPE AUSTEN
WALAISU PT.
NIMBO
WEST CAPE
STATUTE MILES

(Fig. 1)

The climate is tropical, the average temperature being about 82°. During the rainy season, from January to March, it is very hot and humid. The rainfall along the coast is about 120 inches annually. The weather from April to November is fairly cool.

The native population is between ninety and one hundred thousand Melanesian people. They cultivate yams, taros, and coconuts for food and trade. The larger islands are covered with impenetrable jungles. The native pig is one of two native land mammals on the islands. One hundred twenty-seven land birds have been reported from this archipelago and no doubt a number of additional species will be discovered when the interior of the islands is carefully explored.

Many species of interesting insects are found on the Solomon Islands. Several of the service men who collected reptiles also made insect collections. One of the largest general collections was made by Captain Beck. He was stationed on the Tenaru River for a year. During this time he also made some studies of the island vegetation and topography. The following is a statement of his impressions of this part of Guadalcanal.

"Today I made my first trip to the foothills. To the area where I went there was an abrupt climb from the fairly level coastal plain to the contrasting region of grassland and forest. In this particular part of the foothills are large grass patches surrounded by the jungle forest. The grass and forest areas both have the same elevation, angle of exposure of the sun, drainage and soil conditions, yet the two types of vegetation are sharply separated. I discovered that when one tries to stay out in the open grass areas, when the sun is beating down, the heat is almost beyond human endurance. On several occasions I tried to remain out in the grass collecting insects but the heat was so oppressive I became dizzy and for several minutes after retiring to the jungle I had a severe head-ache.

"This intense heat on a clear day may account for the absence of bird life in the grasslands. With the exception of an occasional swallow flying above the grass one does not see a bird. The mammal life so common to grasslands, in the States, is nonexistant in the grass areas on this island. One does not escape the heat by dropping into the grass, which is four to five feet high. The heat seems to be more suffocating. In contrast I found in the forest jungle that there is a combination of shade and openness to allow for air movement.

"It is possible, with reference to birds, that the lack of fruits may

in part account for the absence of birds in the grasslands, but I really believe it is a heat factor. The forest jungle has quite an array of bird life, large or small, loud or quiet, colorful or drab. I was impressed by the variety of songs."

Mr. Robert C. Pendleton who spent twenty-two months in the Solomon Islands and has published his findings, 1949, gives a clear picture of the plant formations of Guadalcanal. The following excerpts are from his study.

"Guadalcanal is well within the true tropic belt and the work of many plant geographers indicates that a rain forest type of vegetation should be expected. However, this island differs in having the major portion of the north coast covered with coarse grass while a true rain forest vegetation occurs only in the south portion and on the mountains.

"The main mountain ranges on the island are approximately parallel and occupy a central position. They average about 6,000 feet in elevation in the central portion of the island and Mt. Popomanasiu reaches a maximum height of 8,005 feet. Their position across the prevailing trade winds is the factor considered responsible for the grassland formation on the north coast and on the west tip of the Florida group beyond.

"Comprehensive ground studies were made only on the north coastal plain, because travel to other portions was extremely difficult and the press of military duties prohibited any long trips. It was possible to study the vegetation from the Belasuna River to Cape Esperance and to penetrate the hinterland along the Malimbu, Poha, and Tenaru Rivers to a depth of 8 to 12 miles. Air trips were arranged through the courtesy of the pilots of the 13th Air Force. On these flights the entire island was covered and a far better idea of the physiognomy and extent of plant cover types was obtained.

"From the air the contrast in plant cover on Guadalcanal as compared with that on other Solomon Islands is striking. A flight along the north coast of the island from east to west reveals that the eastern third of the plain is densely covered with rain forest but the western two-thirds is covered predominately by grass. The rivers, running through the grassland support strips of forest, which connect the forests of the mountains with the narrow strand forest which forms a green border on the coast.

"Guadalcanal is one of the southern islands of the Solomon Group and is characterized by having a rain forest on the south side

and grasslands on the north side. It is the only island of the group having a mountain chain at right angles to the prevailing wind direction.

"The ecological factors responsible for the grasslands of Guadalcanal are both climatic and topographic. In the rain shadow insufficient rain falls during several months to support a forest. The grassland is not due to fires or soil deficiencies."

THE HERPETOLOGICAL FAUNA

To what extent the herpetological fauna of the grasslands and rain forests of Guadalcanal differ has apparently not been determined. In this report all the species studied were collected on the north side of the island. Likewise, so far as I have been able to determine, previous collections were in the main made on the north side of Guadalcanal. An ecological study of the species confined entirely to the grassland, as well as those found in the interior of the island on the higher mountains should be of value. The irregular and frequently reduced rainfall on the grasslands along with the intense heat possibly deters the movement of rain forest species over large areas of the island.

An equally interesting problem is that of tracing the origin of the reptile fauna of the Solomons. While studying the thirty-five species of this report, a check list of the amphibians and reptiles of the Solomon Islands was prepared and is included here. A comparison of the Solomon Islands list with the New Guinea one, Loveridge, 1948, reveals that, even though there are a number of endemic species in the Solomon Islands, the general facies of the fauna is New Guinean. This suggests that the Solomon Islands were, no doubt, in the distant past connected with New Guinea, as New Guinea was likewise once connected with Australia. After the Solomon Islands land mass was separated from New Guinea evidence supports the belief that the present two chains of islands developed which has contributed to the endenism of the several Islands. It has recently been pointed out by Brown and Myers, 1949, that "the Solomons display an important endemic frog fauna, including at least three endemic ranid genera." This is as it should be, if the above point of view is correct, that these continental islands were once a part of New Guinea, which now has four times as many endemic frogs as the Solomons.

One should not conclude from the above that the Solomon fauna

is entirely New Guinea-Australian in origin. Aside from the New Guinea-Australian affinities are found such genera as *Gymnodactylus*, *Gekko*, *Pseudogekko*, *Typhlops*, and *Hydrophis* which are represented by many species in the northern Islands.

There are still many unsolved problems relevant to the distribution of the herpetological fauna of the South Pacific Islands. Each year, however, progress is being made in wearing down the obsticles which stand in the way to a clear understanding of the origin and distribution of the amphibians and reptiles.

ACKNOWLEDGMENTS

Without the painstaking efforts of Captain D E. Beck, Ernest Reimschiissel, Doyle Taylor, R. C. Pendleton, J. Chattin, H. Hawkins, L. Adams, and other servicemen the materials upon which this report is based would not have been collected. To them I express my thanks. Dr. W. C. Brown has been very cooperative in loaning the writer rare literature and checking the determination of some species. Dr. Doris Cochran, Curator of Herpetology at U. S. National Museum kindly loaned the writer many Solomon Island species. Dr. Karl P. Schmidt loaned the writer some literature and checked the determination of two specimens. Prof. Charles Wharton of Emory University, Georgia, kindly submitted some interesting species to me for study. Dr. J. R. Heath of San Jose Teachers College, Dr. Geo. Myers of Stanford University, and Dr. R. Stebbins of the University of California, at Berkeley, loaned the writer a number of Solomon Islands specimens.

To all who have assisted, in any way, as mentioned above, I express my thanks and appreciation.

AMPHIBIANS

Family Bufonidae

BUFO MARINUS (Linnaeus)

Linnaeus, Systema Naturae, 10th Ed., Vol 1, p. 211, 1759 (Rana)

BYU 6960, 6969, 7015-17	Guadalcanal, (D E. Beck) May, 1944
BYU 11020 (48-A) (49-A)	Gavutu Isl. (R. C. Pendleton) May 8, 1945
No. 3-A-6A	Guadalcanal, (R.C.Pendleton) Dec. 22, 1943
No. 20-A	Guadalcanal, (R.C.Pendleton) May 12, 1944
No. 24-A - 36A-39A	Banik Is., (R. C. Pendleton) Sept. 21, 1944 Russell Isls.

The specimens of *marinus* from the Solomon Islands are represented by three adult males (BYU 11020, 48A, and 49A), females

(BYU 6960, 4-A, and 20-A), and several juveniles. The females are similar to adults of the same sex, which I have examined, from Saipan Island of the Mariana Islands and Carmen, Nuevo Leon, Mexico. The males, the first adults I have seen, differ considerably from the females in their vestiture. They have numerous spines over the back and legs in contrast to the few found in the females. The large tuberclers or warts of the females have usually one spine and very few in between, while the male warts have a cluster of spines and many small ones scattered between these warts.

Dr. Beck made the following observations on the color of a live female: "The dorsal ground color is greyish green. The large glands are tawny with reddish tint. Laterally the body is yellow with a tinge of green, which color extends anteriorly along the upper mandibles. The belly is white and grey streaked. The eyes have a black iris and a silver to pale yellow cornea. The tympanium is grey."

Mr. Pendleton collected this toad in the pools and ditches of the cocus groves.

This introduced species is apparently wide spread in the South Pacific Islands where it is used as a help in controlling insects.

Family Hylidae

HYLA THESAURENSIS Peters

Peters, Monatsh. Akad. Wiss. Berlin, p. 421, 1877.

BYU 6972, 7019, 7266	Guadalcanal (D E. Beck), May, August, 1944
BYU 7048-52, 7160	Guadalcanal (D E. Beck), July, August, 1944
BYU 7452-65, 7750-63	Guadalcanal (D E. Beck), March, 1945
BYU 7139-42, 7868	Guadalcanal (D E. Beck), June, 1944
BYU 7066, 7104-5	Guadalcanal (E. Reimschiissel), July, Aug., 1944
No. 28-A	Mono Island (R. C. Pendleton), Nov. 26, 1944
No. 1-A, 2A	Guadalcanal (R. C. Pendleton) Dec. 20, 1943
No. 7-15-A	Guadalcanal (R. C. Pendleton), March, April, 1944

Many tadpoles taken by Beck and Reimschiissel.

A study of the fifty-four specimens listed above are found to vary considerably in color and general morphology. Some of the preserved adults, as well as juveniles, have white markings along the median dorsal and lateral parts of the body and head, others are fairly uniform in grey color while some are grey with dark blotches. The one specimen from Mono Island shows the dark blotches on a grey background. It also has a longer more pointed head than the Guadalcanal specimens and the web does not extend up the fourth toes as far as in the Guadalcanal specimens.

Captain Beck reports that some individuals of this tree frog, when alive, are colored as follows: "The large red bronzed eyes with dark pupil contrasts vividly with the yellow-green pattern on the dark velvet brown of the dorsum. The yellow pattern is almost an iridescent tone in certain light reflections. In some specimens there are yellow-green lateral and medial stripes and two dots of this color between the eyes. There is also a yellow strip at the anal region and one on each side of the head with a tiny dot at the extreme anterior part. Ventrally, the rear legs, the anal regions, forelegs, pectoral girdle, and edge of the mouth is a pale blue-green color. The rest of the body is white."

Some of the largest specimens are 47 mm. in body length with oblique vomerine teeth placed between the choanae; tympanum three-quarters the eye diameter; and with outer finger one-third webbed.

Both Captain Beck and Mr. Pendleton report this species as common on leaves of the forest floor plants. Specimen no. 28-A was taken on the leaf of Plantain; altitude 300 feet.

Barbour (1921), Burt (1932), Loveridge (1948), and W. C. Brown, manuscript, have considered *macrop*, *lutea*, and *solomonis* as synomyns of *thesaurensis*. The material before me seems to support this conclusion.

Family Ranidae

CERATOBATRACHUS GUENTHERI Boulenger

Boulenger, Proc. Zool. Soc. London, p. 212, 1884.

BYU 7018, 7143-4	Guadalcanal (D E. Beck), June, August, -1944
BYU 7147, 7449-51	Guadalcanal (D E. Beck), January, 1945
BYU 8934 (47-A), 8936 (43-A)	Russell Island (R. C. Pendleton), April, 1945
BYU 11019 (25-A)	Florida Island (R. C. Pendleton), Nov., 1944
Nos. 26-27A, 31A	Florida Island (R. C. Pendleton, January, 1945
Nos. 33A, 41A, 43-46A	Banik, (R. C. Pendleton), April, 1945 Russell Islands

This distinctive monotypic endemic frog has teeth on both the upper and lower jaws; vomerine teeth in two groups just back of the line between the choanae; tongue notched; pupil large and horizontal; head triangular, large, widest at spines on upper jaw just beneath the tympanum, which is larger and vertical. Interorbital space broad and concave. Folds or spines at tip of snout, over each eye, at the angle of the mouth and above the tympanum, on the forearm and the heel. Tips of fingers and toes only slightly enlarged.

fifth toe shorter than the third and toes with rudimentary web.

Length from snout to vent of the largest specimen in the collection is 69 mm.

The color of a live specimen as observed by Captain Beck is as follows: "The dorsal surface of the head and abdomen is unicolorous, dorsal surface of the legs maculate with dark and light tones of brown. The medial dorsal part of the body is a slightly darker color than the rest. The brown color is earthy in appearance. Ventrally the color has a tint of red in the brown with a denser punctation of yellowish steppling. There is a row of tiny dots along the edge of the lower jaw. The dorsal edge of the eye has a pale blue-green band. The iris is bronze and the pupil black."

RANA PAPUA NOVAEBRITANNIAE Werner

Werner, Zool. Anz., Vol. 17 p. 155, 1894.

BYU 7053-55 Guadalcanal (D E. Beck), July, 1944
BYU 7475-16 Guadalcanal (D E. Beck), December, 1944

Three Guadalcanal specimens have been assigned to *R. p. novaebritanniae* by W. C. Brown (manuscript). They are all white bellied with backs which are light brown. Loveridge, 1948, comments on this form as follows: "Actually the white-bellied *Rana novaebritanniae* is perfectly distinct from the mottled-bellied *kreffti*, and its uniformly white underside appears to separate it also from *R. p. papua* Lesson."

The live color of this frog as observed by Dr. Beck is as follows: "The dorsum is olive-brown; around the tympanum and before the eyes is dark-brown, while that of the lateral area of the abdomen is greyish brown, the edge of the lower jaw is slightly mottled. The dorsal surface of the legs are light and dark brown in color. The undersurface of the body is a pale whitish-blue color with a tendency to produce an opalescent sheen. The iris ring of the eye is yellow bronze while the remainder is red. The pupil is a deep blue-black color."

DISCODELES GUPPYI (Boulenger)

Boulenger, Proc. Zool. Soc. Lond., p. 211, 1884.

BYU 8912 (No. 32-A) Florida Island (R. C. Pendleton), March 13, 1945

Recently, Brown (manuscript) has proposed that *guppyi* be placed in the genus Discodeles which is one of the nine subgenera into which Boulenger divided the genus *Rana*. Kinghorn, 1928, gives a concise characterization of this species. The specimen discussed in

this report is a small one, 24 mm. from snout to vent, with hind leg 41 mm. in length. The vomerine teeth are in an oblique series behind the choanae. The "tips of the toes and fingers dilated into discs, the upper surfaces of which are separated from the lower by a crescentic or horseshoe-shaped groove; web not penetrating far between the outer metatarsals."

PLATYMANTIS PAPUENSIS WEBERI Schmidt

Schmidt, Field Mus. Nat. Hist., Zool. Vol. 18, p. 178. 1932.

BYU 8916 (23A) 8917 (22A)	Guadalcanal (R. C. Pendleton), June 5, 1944	

These two specimens 23 and 24 mm. in length from snout to vent agree well with Dr. Schmidt's description of specimens from Tulagi and Isabel Islands. The short oblique series of vomerine teeth close to the choanae, snout pointed with the nostrils much closer to its tip than the eye, the circular tympanum, upper eye lids regular, toes and fingers with small disks, toes without webs, and dorsum with five to six rows of ridges characterize the two specimens from the Tenaru River of Guadalcanal.

The color is grey with black blotches on the upper surface of the legs and over the ridges of the back. Ventral surface is white except on the chin where there are some dark blotches.

These two specimens were taken in "trash" in the Little Tenaru River by Mr. Pendleton.

BATRACHYLODES VENTEBRALIS Boulenger

Boulenger, Proc. Zool. Soc. Lond. p. 337, 1887.

BYU 8915 (34A)	Banika Russell Islands	(R. C. Pendleton)	January, 1945
No. 30-A	Russell Islands	(R. C. Pendleton)	January, 1945
No. 35-A	Florida Islands	(R. C. Pendleton)	April 16, 1945

No vomerine teeth; tongue broadly attached, anteriorly elongate, posteriorly oval and not notched. Tympanum round, 1.5 mm. in diameter; pupil horizontal; snout short and obtuse; finger disks larger than those of the toes; toes only slightly webbed.

Color brown and grey matched dorsally, skin smooth; ventral surface white except for peppering on legs and chin, small tubercles on gular area. Length from snout to vent of specimen No. 8915 is 21 mm.

Mr. Pendleton collected the Banika specimens at an altitude of 200 feet in a sunny opening in the rain forest.

SERPENTES

Family Typhlopidae

TYPHLOPS ALUENSIS Boulenger

Boulenger, Proc. Zool. Soc. of London, p. 336, 1887.

BYU 7102	Guadalcanal near Henderson Field	(E. Reimschiissel)	August 5, 1944
BYU 7245	Guadalcanal near Doma Cove area,	(Lt. Reibes) (D E. Beck)	August 29, 1944
Nat. Hist. Mus. Stanford University No. 1131	Tetere Area Guadalcanal	(J. R. Heath)	February, 1944
University of Calif. Nos. 40751, 40752	Guadalcanal, 1 mi. inland, Nalimbus R.	(Lowell Adams)	June 7, 1944
U. S. National Museum, Nos. 120212-21	Torokina, Bougainville Island, Solomon Islands	(W. L. Necker) (A. B. Gurney)	
U. S. National Museum, Nos. 81893-94	Tulagi, Solomon Islands	(K. R. Stevenson)	
U. S. National Museum, No. 122327	Guadalcanal, Doma Cove Solomon Islands	(Q. A. Muennink)	
U. S. National Museum, No. 76824	Malaita, Solomon Islands	(S. M. Lambert)	

Mid-body scale rows twenty-two; urosteges twenty-two to twenty-three; nasal cleft extends to the posterior portion of the first upper labial; eyes distinct, showing through the large ocular scales which extend down between the second and third upper labial; snout rounded in a lateral view; nostrils lateral. Length largest specimen, University of California, No. 40752, 257 mm.; body diameter 7 mm.

Color dark brown on the back and sides, under surface, consisting of three rows of scales, yellowish.

TYPHLOPS BECKI Tanner

Tanner, Great Basin Naturalist, Vol. 9, pp. 15-16, Figs. 4 and 5' 1948.

BYU 7448	Guadalcanal, Tenaru River, Solomon Islands	(D E. Beck) (E. Ramay)	November 30, 1944

Midbody scale rows twenty, transverse body scales two hundred and six; urosteges fourteen; head oval when viewed from above; snout projecting 1.8 mm. beyond the mental; rostral with parallel sides; nasal cleft extending to the anterior part of the second upper labial; prefrontal larger than the frontal; supraoculars about half the size of the parietals and in contact with the nasals, prefrontal, frontal, parietals, ocular and preocular; upper labials four; eye shielded by the ocular, which comes in contact with the second and

third labials; the preocular contacts the first and second labials. Body length one hundred twelve mm.; tail five mm.; diameter four and eight tenths mm.

Color above dark brown, ventral light brown head pale grey, eyes grey with black pupils, terminal spine of the tail small and blunt.

TYPHLOPS INFRALABIALIS Waite

Waite, Rec. South Austr. Mus. I, pp. 35-63, Fig. 25, 1918.

BYU 7040	Guadalcanal Nalimbus River Solomon Islands	(Geo. Nazaruk) (Lowell Adams) (D E. Beck)	June 21, 1944

Mouth inferior, rostral and nasals projecting dorsally beyond the mental, nasal cleft extends to the posterior half of the first upper labial. No supranasals. Preocular not in contact with the ocular. An ocular, posterior ocular, subocular, and supralabial on an area normally covered by the ocular. Eye indistinct; supralabials four, infralabials three. Midbody scale rows twenty-eight, transverse body scales four hundred sixty-six, urosteges sixteen; anal five. Body length three hundred forty-four mm.; tail eight mm. body diameter just posterior to the anus six mm.

The eight to ten ventral scales are clear yellowish white while the eighteen to twenty side and back ones have brownish central spots surrounded by light borders. This gives a distinctly uniform spotted or checkered appearance.

TYPHLOPS **ADAMSI** Tanner n. sp.

Univer of Calif. No. 40753	Guadalcanal Nalimbiu River, Solomon Islands	June 6, 1944 (Lowell Adams)

Type: Midbody scales twenty-six, gastrosteges four hundred fifty-one; urosteges seventeen; anal five; supralabials four; infralabials three; nasal cleft extending to the rostral and the anterior upper surface of the second supralabial; preocular and postocular fused into one scale which touches the posterior part of the nasal and the anterior part of the ocular; parietals large and in contact behind the frontal. Length of body one hundred forty-eight mm.; diameter three and one-half mm.

Color light brown with dark brown spots in center of scales on back and sides; ventral scales yellowish.

Adamsi may be distinguished from *infralabialis* as follows: Body scale rows 26; nasal cleft extending to nostril and the second

supralabial; preocular and postocular fused into one scale, parietals large and in contact behind the frontal. The head scales are symmetrical.

TYPE LOCALITY: Nalimbiu River, Guadalcanal, Solomon Islands. Collected by Lowell Adams, June 6, 1944. Type in the Herpetological collection of the Museum of Vertebrate Zoology, University of California at Berkeley, California.

I am pleased to dedicate this species to Mr. Lowell Adams who collected a number of interesting reptiles in the South Pacific area. I also want to thank Dr. R. Stebbins for the loan of museum specimens of Typhlops from the Solomon Islands.

Family BOIDAE

ENYGRUS CARINATUS (Schneider)

Schneider, Hist. Amph. II, p. 261, 1801.

BYU 6961 7135	Guadalcanal, Solomon Islands	(D E. Beck)	May 22, 1944
BYU 7103, 7137-38	Guadalcanal, Solomon Islands	(John Chattin) (D E. Beck)	June 27, 1944
BYU 7148, 7232	Guadalcanal, Solomon Islands	(John Chattin) (D E. Beck)	October, 1944
BYU 7246, 7330	Guadalcanal, Solomon Islands	(E. Reimschiissel)	August 5, 1944
BYU 7901	Guadalcanal, Solomon Islands	(E. Reimschiissel)	August 5, 1944

Midbody scale rows thirty-seven to thirty-eight; urosteges forty to forty-two; supralabials eleven to twelve; infralabials thirteen; anal undivided. Specimen No. 7138 has well developed visible bony spurs which are used in the movement of the snake. Two specimens were received alive from Guadalcanal, one of them No. 7901 lived eight months in a small cage, during this time it ate two bats.

The color of specimen No. 6961, which was captured by Captain Beck, was described as follows: "Dorsally the pattern is dark brown (earthy) while the lateral color is slate grey with a brownish tint. At the lateral and ventral contact scattered white and red scales are found with black spots on some scales, which are distributed so as to give a speckled appearance. The red and black scales, however, are found to be grouped so as to give a definite pattern on the outside edge of the ventral scales. The middle scales of the belly are white to cream with black speckling. The color extends to the anal region where the red scales and speckling discontinue. The chin is mottled grey. The eyes are speckled grey. The under surface of the terminus of the nose has black spots."

Family Colubridae

BOIGA IRREGULARIS (Merrem)

Merrem, Bechst, Uebers, Lacep. IV, p. 239, 1802.

BYU 6962, 7041	Guadalcanal, Solomon Islands	(D E. Beck)	May 22, 1944
BYU 7231, 7227	Guadalcanal, Solomon Islands	(J. Chattin) (D E. Beck)	September 18, 1944
BYU 7248, 7970	Guadalcanal, Solomon Islands	(D E. Beck)	September 18, 1944

Rostral broader than deep, internasals shorter than the praefrontals; supralabials eight to ten; infralabials twelve to thirteen; midbody scale rows twenty-one; gastrosteges, average of six specimens, 229; urosteges, average of five specimens, 105 plus; the total length of the largest specimen No. 7231 is 1043 mm. the tail length being 242 mm.

AHAETULLA CALLIGASTER (Gunther)

Gunther, Ann. Nat. Hist., (3) XX, p. 53, 1867.

BYU 7039	Guadalcanal, Solomon Islands	(D. E. Beck)	July 10, 1944
BYU 7118	Guadalcanal, Solomon Islands	(J. Johnson) (H. Hawkins)	August 10, 1944

Midbody scale rows thirteen; gastrosteges one hundred seventy-eight and one hundred eighty-one; urosteges one hundred nineteen and one hundred forty; anal divided; supralabials eight; infralabials nine; preoculars one; postoculars two; loreal one; temporals two; length, No. 7118, 1101 (725 + 376) mm.

Color in life as recorded by Beck. "The dorsum of the anterior one fifth of the body is bright rust color. The remainder of the body is an olive green. The lateral patterns are very indistinct, but when the snake expands its body the color shows up to a greater extent The neck region laterally is orange red when the scales are spread apart. The edges of some of the scales are orange in color. There are also black lateral bands in the neck regions, this color seems to be due to the coloration of the body membrane."

The eyes are mottled bronze and brown. The upper part of the iris is mainly bronze. The pupil is round and black.

DENISONIA PAR (Boulenger)

Boulenger, Proc. Zool. Soc. London, p. 210, 1884.

BYU 7117, 7247	Guadalcanal, Solomon Islands	(D E. Beck) (R. T. Brice)	August, 1944
BYU 7329	Guadalcanal, Solomon Islands	(D E. Beck)	December, 1944

Midbody scale rows fifteen; gastrosteges one hundred sixty-five to one hundred sixty-six; urosteges fifty-three; anals two; supralabials seven; infralabials seven; preoculars one; postoculars two. The total length of specimen No. 7117 is 744 (630 + 114) mm.

This is a fairly common species on Guadalcanal.

LATICAUDA COLUBRINA Schneider

Schneider, Hist. Amph., I. p. 238, 1799.

BYU 7061	Guadalcanal, Solomon Islands	(D E. Beck)	July 30, 1944
BYU 7328	Russell Island, Solomon Islands	(Major R. T. Brice)	October 28, 1944

Midbody scale rows twenty-three; gastrosteges two hundred seventeen to two hundred twenty-one; urosteges forty-one to forty-three; anal two; supralabials seven; infralabials nine; preoculars one; postoculars two; temporals one and two. The total length of specimen No. 7328 is 373 (289 + 44) mm.

The color in life as recorded by Captain Beck is as follows: "The yellow on the anterior dorsum of the head and the first ring back of the black head patch as well as the lateral hue of the upper jaw is distinctive. The tip of the flattened tail is pale cream color. The black bands are broadened dorsally and narrowed ventrally except the tail bands which are broadened laterally. There is a pale yellow spot on the center of the dorsal black head shield.

"The eye is small, the iris is a mottled pale greyish, the area outside of the iris is dark brown."

HYDROPHIS CYANOCINCTUS Daudin

Daudin, Hist. Nat. Rept. VII, p. 383, 1803.

BYU 7861 Guadalcanal, Solomon Islands (D E. Beck), March, 1945

Rostral broader than deep with marginal grooves; nasal shorter than the frontal, twice as long as the suture between the praefrontals; praefrontals in contact with the second supralabial; one preocular; two postoculars; temporals three and one; eight upper labials, second largest, third, fourth and fifth entering the eye; infralabials ten and nine; both pair of chin shields in contact; body scale rows twenty-seven anterior thirty-seven at midbody, thirty-three posterior near anus; anals two pairs; gastrosteges three hundred thirty-four; urosteges forty-three; scales smooth and sub-imbricate.

Color of preserved specimen black above with forty-seven light bands extending from the dark back to the ventral surface. A single

row of larger black gastrostege scales separates the light bands. The head and chin are light colored. The tail for the length of twenty-two scales is black. Total length is 1028 (927 + 101) mm.

This seems to be a new record for Guadalcanal and the Solomon Islands. De Rooji, however, reports *cyanocinctus* for New Guinea. Kinghorn, 1929, and Schmidt, 1932, reported specimens of *Chersydrus granulatus* from Malaita and Isabel Islands which constitute rare records for the Solomon Islands.

SQUAMATA - SAURIA

Family Gekkonidae

GYMNODACTYLUS PELAGICUS (Girard)

Girard, Proc. Ac. Philad. 1857, p. 197.

BYU 6966, 6987-88	Guadalcanal	(D E. Beck)	July-August, 1944
BYU 7021, 7101, 7155	Guadalcanal	(D E. Beck)	May-June, 1944
BYU 7290-91 7467, 7472	Guadalcanal	(E. Reimschiissel)	January, 1945

A comparison of the specimens listed above with those reported by the writer from Morotai show a similarity in size, coloration, and scalation. De Rooij does not list this species from Halmahera or Morotai.

The following observations on the habits and color in life of specimens collected by Captain Beck are as follows: "Specimens of this lizard were collected on tree trunks, screen door of the insectory, under logs and debris on the forest floor. The skin is delicate which necessitates handling the specimens with care in order that it will not be broken. The ventral surface is violaceous while the dorsal surface is brown with pale yellow tiny spots scattered about. This species is secretative and hard to capture unless exposed by the turning over of logs and rocks."

GEHYRA OCEANICA (Lesson)

Lesson, Voyage Coquille, Zool. II, Pt. I, 1830, p. 42.

BYU 6967, 7062-63	Guadalcanal	(Beck & Reimschiissel)	July, 1944
BYU 7059, 7132-34	Guadalcanal	(D E. Beck)	June, July, 1944
BYU 7473, 7748, 7749	Guadalcanal	(D E. Beck)	January, March, 1945
BYU 7746-47	Segi Point, New Georgia Island	(Lt. (J.G.) C. O. Berg)	June, 1944

The life color of this lizard was reported by Captain Beck as follows: "In the screen house the color was silvery to grey with very indistinct pale lemon yellowspots on the dorsum of the neck

and shoulder region and laterally on the abdomen. In the laboratory the whole animal assumed a darker hue. The above markings become more definite. A distinct brown speckling was apparent on the dorsum of the whole body. The dorsum of the head is a pale, pastel green. The markings above the hind leg region and the abdomen are a pale violet color."

The whole undersurface of the body is cream colored, except the feet of the fore and hind legs, the posterior surface of the hind legs and the undersurface of the tail which are a salmon pink color.

The eyes are a bright color with a vertical black irregularly shaped pupil. The tongue is a bright flesh pink.

This lizard is common in and about the camp buildings. It feeds upon insects found on the screens and walls of the tents.

LEPIDODACTYLUS LUGUBRIS (D. & B.)

Dumeril and Bibron, Erp. Gen. III, 1836, p. 304.

BYU 7004-5, 7008	Guadalcanal	(D E. Beck)	June, 1944
BYU 7010, 7046, 7056-57	Guadalcanal	,D E. Beck) (J. Chattin)	July, 1944
BYU 7064-65, 7115	Guadalcanal	(D E. Beck)	August, 1944
BYU 7253	Guadalcanal	(D E. Beck)	May, 1944

The guadalcanal specimens agree with those from Morotai in morphological characters, the lamellae and scansors of the fourth toe are as follows: Nos. 7004-9 + 4; 7005-6 + 5; 7008-5 + 4; 7010-10 + ?; 7056-6 + 4. The supralabials are 10 to 12 in number; infralabials 10 to 12. Ground color grey to brown with scattered small blackish areas on the back and sides; venter white to pinkish.

LEPIDODACTYLUS GUPPYI Boulenger

Boulenger, Proc. Zool. Soc. Lond., 1884, p. 210.

BYU 7047 Guadalcanal, Solomon Islands ,D E. Beck) July, 1944

Rostral wide extending between the nostril cavities, not high, not any higher than the supralabials; supralabials twelve, infralabials eleven; mental small wedge shaped, one third as wide as the rostral. Submentals irregular five rows of round enlarged scales, head broad and shorter than in *lugubris;* eleven lamellae under the median finger and thirteen under the median toe; digits with small web at base and moderately dilated. Length 73 (41 + 32) mm.

The following observations on the color in life of this specimen are taken from Captain Beck's field notes number 214, July 21, 1944: "This gekko may or may not be a different specimen than I have

taken before. It does have a different color pattern than the regular run of gekkos I have observed or collected.

"Dorsally it is grey: the color being due to light splashes and pin point speckling of grey. The tail has three light color bands. These are five distinct black dots at the ventro-lateral contact. There are three dorso-lateral black dots, the first at the neck region, the last one approximately above the first vento-lateral dot. There are lateral pouch-like swellings in the region, these swollen regions are cream colored and splashed with light brown markings. The eyes are bronzed flecked with brown. Extending posteriorly at the ventro-posterior margin of the eye is a black line. It reaches about half way to the ear. Ventrally the body is pale with fleckings of brown. When the specimen was placed in 70 per cent alcohol the whole body became much lighter in color."

LEPIDODACTYLUS WOODFORDII Boulenger

Boulenger, Proc. Zool. Soc. 1887, p. 334.

BYU 7145-46	Guadalcanal	(D E. Beck)	June, 1944
BYU 7254-7292-93	Guadalcanal	(D E. Beck)	August, 1944
BYU 8894	Guadalcanal	(D E. Beck)	September, 1944

Specimens are all small; about 47 mm. total length, tail minus in some specimens. With distinct zigzag black cross bands on the grey color of the back; digits without web, twelve supralabials, ten infralabials; a faint black streak extending from the nostril through the eye to the neck.

These specimens were considered as immature forms of *Gehyra oceanica* by Captain Beck.

Dr. Walter C. Brown is making a careful study of the species of Lepidodoctylus and has recently informed me that he suspects L. *woodfordii* may be a synonym of *L. lugubris*.

PSEUDOGEKKO SHEBAE Brown and Tanner

Brown & Tanner, The Great Basin Naturalist, Vol. 9, Nos. 3-4, 1948, pp. 41-45, figs. 1 and 2.

BYU 7002, Type Specimen	Guadalcanal Lunga River Area	(John Chattin) (D E. Beck)	May 31, 1944

This species, represented by a unique specimen, is far removed from the genotype area which is Batan Province, Luzon Island, Philippine Islands. It is also interesting to note that the genotype species *compresicorpus* is based on a single female specimen. The specimen has probably been destroyed since Dr. Taylor deposited it

in the Philippine Bureau of Science collection in 1915.

Shebae differs from *compresicorpus* mainly in the number of supralabials, 10 as compared to 19 or 20, infralabials, 9 as compared to 16, the presence of enlarged chin shields, and the undivided condition of the terminal lamella. Unfortunately, only one specimen of this species was collected. Captain Beck reported that he thought this species was common around the camp. It may be easily confused with other species of gekkos in that area. The type specimen of *shebae* is deposited in the Herpetological Collections of the Brigham Young University.

Family Varanidae

VARANUS INDICUS (Daudin)

Daudin, Rept. III, p. 46, 1802.

BYU 7136 Guadalcanal (D E. Beck) June 16, 1944

This is the only representative of this family in the Solomon Islands. The long snout with the nostril near the tip, the fairly large head and supraocular scales, the arrangement of the almost square abdominal scales in rows, the strong limbs with long digits and sharp claws, the compressed tail with the dorsal scales keeled are the most noticeable characteristics of this species. The size is 915 mm. in length.

Comments on the color and food of this specimen are taken from Captain Beck's notes as follows: "This animal which is black with a speckled yellow pattern was found in a heavily wooded thicket near the swampy region. The natives were clearing the wooded spot when the lizard was seen. These lizards are common but are swift in escape. When captured alive they make painful scratches on the captor, with their claws, which are long and sharp. This lizard is very much of an arboreal animal.

"Checking the stomach, I found the remains of the common land crab, bird feathers, and the tail of a striped skink."

Family Scincidae

CORUCIA ZEBRATA Gray

Gray, Proc. Zool. Soc. Lond. 1885, p. 218, pl. 8.

BYU 7119	Guadalcanal	(Anthony Ross)	June 30, 1944
BYU 7120	Guadalcanal	(D E. Beck) (J. Johnson) (E. Ramey) (H. Hawkins)	June 30, 1944

Rostral small, between the nostrils, two-thirds as wide as high, frontonasal large, hard and somewhat polished, as wide as high, 18 mm.; two large temporals; eight supralabials, the seventh as long as the fourth, fifth and sixth; seven infralabials, the fifth 15 mm. long on specimen 7120; mental small, the submental much larger; eyelids scaly; nostril in a single nasal which is in contact with the rostral, first supralabial, anterior loreal and frontonasal; tympanum large; body scales about twice as large dorsally as ventrally, 40 around the middle of the body; digits well developed with large, sharp claws, the fourth toe half as long as the leg and with 22 lamellae; tail long and prehensile, total length of specimen No. 7119,610 (255 + 355) mm. and specimen No. 7120,485 (167 + 318) mm.

The life color of this species was observed by Captain Beck. The following has been extracted from his field notes: "The color pattern is dorsally a series of grey-green cross patches with dark brown scales scattered through these areas. Narrower cross lines of blue-grey separate the larger areas. In one specimen these lines are pale yellow-green. The larger areas are brownish green. This color arrangement also extends on the dorsal surface of the legs, tail and feet. The dorsal scales of the head have a tendency to be splashed with yellow instead of blue, blue-grey, or yellow-green.

"Ventrally the feet are a mustard yellow with the color extending out part way on the toes. The ventral part of the tail, abdomen, and thorax is a grey-blue as on the dorsum of the body. There is an indistinct patterning of the ventral area proper by faint grey-green lines. The scales of the chin are yellow-green.

"The eyes are greenish with a black pupil."

Captain Beck kept one of these specimens in captivity for about two weeks. "I find it is quite docile in captivity. Only when it has been molested has it given any signs of protecting itself. Upon being teased it leans to one side, backs away using its tail where ever it can attach itself, then opens its powerful mouth. Standing high on its short front legs, holding its mouth open it is ready to firmly bite onto any object getting close enough to be clamped on to. Closing the mouth it occasionally thrusts its short stubby pink colored non-forked tongue out."

This lizard which is endemic to the Solomon Islands feeds upon leaves of trees at night and sleeps in the cavities of the trees during the day. The two specimens before me are perfect ones.

PEDIPORUS SCHMIDTI (Burt)

Burt, Am. Mus. Novitates No. 427, June, 1930, p. 3.

BYU 6973-4, 6975	Guadalcanal	(E. Reimschiissel)	August, 1944
BYU 7006-7, 7011-13	Guadalcanal	(E. Reimschiissel)	May, 1944
BYU 7028-37	Guadalcanal	(E. Reimschiissel)	September, 1944
BYU 7076-80, 7111	Guadalcanal	(E. Reimschiissel)	July, 1944
BYU 7153-54, 7156-58	Guadalcanal	(E. Reimschiissel)	September, 1944
BYU 7261-2, 7269-89	Guadalcanal	(E. Reimschiissel)	July, 1944
BYU 7468-71, 7764	Guadalcanal	(E. Reimschiissel)	July, 1944

Rostral one third as high as wide; nostril in large angular scale; four large supraoculars; mental wide, postmental slightly longer than the large contiguous chin shields; tympanium large and unguarded; head wide at the temporal region; five rows of large keeled ventral scales; two large preanal scales; lateral and dorsal scales heavily keeled and spiny, two dorsal rows of large scales; an average of 30 to 33 from occupit to base of tail; 29 to 30 ventral scales from large chin shields to preanal scales. Scales of the head heavily striated; 18 to 20 lamellae under the fourth toe of the hind foot. Length 101 (40 + 61) mm. The fifty-three specimens reported above are in very good condition. Color of dorsal dark brown, ventral light brown, tail and lateral body with light bands and stripes.

LYGOSOMA (SPHENOMORPHUS) CRANEI Schmidt

Schmidt, Field Mus. Nat. Hist. Vol., 19, No. 9, p. 182, 1932.

BYU 7088,7297, BYU 7299	Guadalcanal Tenaru River Area	(D E. Beck) (I. Johnson) (H. Hawkins)	August, September, 1944

Rostral three fourths as high as wide; no supranasals; prefrontals in contact along a median suture; frontal long, longer than the combined frontoparietal and interparietal; parietal large; lower eyelid scaly; supralabials eight, infralabials seven; mental, submental and three pairs of chin-shields; twenty-six to twenty-nine lamellae under the fourth toe, thirty-three scales around the middle of the body; scales smooth; length 158 (60 + 98) mm.

This long tailed skink has a light brown ground color with whitish bands which extend from the sides over the back and tail, giving the specimen a banded appearance; on the sides are some dark bars which are very noticeable. The ventral parts are light yellowish with some brown scales on the under surface of the tail.

LYGOSOMA (SPHENOMORPHUS) BIGNELLI Schmidt

Schmidt, Field Mus. Nat. Hist. Vol. 18, No. 9, p. 183, 1932.

BYU 6994-99	Guadalcanal	(D E. Beck)	June, 1944
	Tenaru River	(E. Reimschiissel)	July, 1944

BYU 7069-70	Guadalcanal	(D E. Beck)	August, 1944
BYU 7087, 7089	Guadalcanal	(I. Johnson) (H. Hawkins)	
BYU 7109-10, 7152	Guadalcanal	(E. Reimschiissel)	August, 1944
BYU 7249-50, 7257	Guadalcanal	(E. Reimschiissel)	August, 1944
BYU 7305, 8892	Guadalcanal	(D E. Beck)	September, 1944

Rostral one third wider than high; snout pointed; no supranasals; frontal elongate with a narrow contact with frontonasal; nostril in a single nasal; eyelid scaly; ear opening large; four supraoculars; six supralabials, six infralabials. Mental scales large; submental and three pairs of chin shields large; lamellae 18 under the fourth toe; body scales smooth twenty-two to twenty-three rows around the body at the middle. Length 73 (33 + 40) mm. This is a small species. The specimens listed above are about 65 to 80 mm. in total length.

The color of preserved specimens is a dark brown ground color with small white areas along the sides of the body, over the tail and less over the back. An irregular light band of about two scales in width along the sides. The white spots are due to the distal portion of one to three scales being white. The underside is a cream to white in color on the throat, belly, and portion of the underside of the tail. There is, however, some suffusion of brown scales among the white ones on the underside of the tail.

LYGOSOMA (LYGOSOMA) SOLOMONIS Boulenger

Boulenger, Proc. Zool. Soc. London, p. 334, 1887.

BYU 6976, 6989-93	Guadalcanal	(D E. Beck)	May, 1944
BYU 7014, 7022-27	Guadalcanal	(D E. Beck)	June, 1944
BYU 7067-8, 7071-2	Guadalcanal	(E. Reimschiissel)	July, 1944
BYU 7083-6, 7095-6	Guadalcanal	(J. Johnson) (H. Hawkins)	August, 1944
BYU 7151, 7251, 7300	Guadalcanal	(D E. Beck) (E. Reimschiissel)	August, 1944
BYU 7302-4, 7307-8	Guadalcanal	(J. Johnson) (H. Hawkins)	August, 1944
BYU 7474, 8895	Guadalcanal	(D E. Beck)	January, 1945

Rostral twice as wide as high, in contact with the first supralabial, nasal and frontonasal; internasals not present; prefrontals separated by the frontal, which is in contact with the first and second supraoculars; parietals large and bordered by two to six pairs of nuchals. Lower eyelid scaly. Ear opening large without lobules, supralabials seven, infralabials six; mental large, submental and three rows of chin shields; twenty-six to twenty-eight scale rows around the body; sixteen lamellae under the fourth toe; legs and

digits short. Length 113 (49 + 64) mm.

Color of live specimens according to Captain Beck's notes is as follows: "Dark brown with light brown speckling under surface of body, light tan between fore legs and light rust for a short distance behind the rear legs."

LYGOSOMA (LYGOSOMA) CONCINNATUM Boulenger

Boulenger, Proc. Zool. Soc. London, p. 335, 1887.

BYU 6977-79, 7073-4	Guadalcanal Tenaru River area	(D E. Beck) (E. Reimschiissel)	July, 1944
BYU 7091-2, 7149-50	Guadalcanal	(I. Johnson) (H. Hawkins)	September, 1944
BYU 7159, 7298, 7466	Guadalcanal	(H. Hawkins) (I. Johnson)	January, 1945

Rostral about twice as wide as high; no supranasal; frontanasal broader than high; nostril in a single nasal; four supraoculars; six to seven supralabials and six to seven infralabials, fifth supralabial larger and entering the orbit; ear opening oval and large, lower eye lid scaly; body scales smooth, forty-two around the body at the middle; lamellae under 4th toe, twenty-two to twenty-four; length 144 (62 + 82) mm.

Color a dark brown with zig-zag dark spots or blotches on the back; sides with white spots in the brown ground color; under surface light with some brown spots on the tail; black spots edged with white between the tympanium and shoulder, the dorsal scales with a metallic scheen. This species is common under logs where the soil is moist, but not too wet.

LYGOSOMA (LEIOLEPISMA) ANOLIS (Boulenger)

Boulenger, Ann. Mag. Nat. Hist., (5) XII, p. 161, 1883.

BYU 6964, 7075	Guadalcanal	(E. Reimschiissel)	August, 1942
BYU 7252, 7264	Guadalcanal	(D E. Beck)	August, 1944
BYU 7268, 7765	Guadalcanal	(D E. Beck)	Jan. Feb., 1945

Rostral wide and broad, nostril in one nasal scale; frontonasal large, prefrontals in contact, five supraoculars, large almost in contact on the median line. Mentum, submentum and three pairs of chin shields large; median dorsal pair of scales large, thirty-three around the middle of the body; digits with proximal lamellae expanded, distal ones contracted, fourth toe with seven to nine contracted and fourteen to eighteen expanded lamellae; length 108 (53 + 55) mm.

Color black and sides light to cream, belly white, head with some black.

LYGOSOMA (LEIOLEPISMA) NOCTUA Lesson

Lesson Voy. "Coquille" Zool. 2, p. 48, 1830.

BYU 7000, 7009, 7060	Guadalcanal Tenaru River	(D E. Beck) June, 1944
BYU 7093, 7113, 7294	Guadalcanal	(I. Johnson) July, 1944
BYU 7667, 7867, 8890-1	Guadalcanal	(H. Hawkins) August, 1944
BYU 8893	Guadalcanal	(E. Reimschiissel) Sept., 1944

Rostral twice as broad as high; frontonasal and frontal in contact and long; supraocular four, large, the first two in contact with the frontal; nostril in one nasal scale; seven supralabials and six infralabials; lower eye lid with transparent disc; ear opening medium with out lobules; mental and submental small; twenty-four to twenty-eight scales around the middle of the body. Eighteen to twenty-two lamellae under the fourth toe, average length of five specimens 83 (39 + 44) mm.

Color, a dorsal and lateral white line bordered by dark brown rows of scales; under surface white; tail with some cross bars. There is some variation in these specimens especially in the head scales and color. A large series from the Solomon Islands should be carefully studied. The Morotai and Admiralty Islands specimens are darker in color.

EMOIA CYANURA (Lesson)

Lesson, Zool. in Duperry, Voyage antour du Monde dur La Coquille, Vol. 2 pt. 1, p. 47, 1830.

BYU 6969-71	Guadalcanal	(D E. Beck) May 16, 1944
BYU 6980-86, 7003	Guadalcanal	(D E. Beck) June 2, 1944
BYU 7043-45, 7082	Guadalcanal	(D E. Beck) July, 1944
BYU 7112-7114, 7125	Guadalcanal	(E. Reimschiissel) August, 1944
BYU 7131, 7255, 7258-60	Guadalcanal	(J. Johnson) August, 1944 (H. Hawkins)
BYU 7256, 7301, 7306	Guadalcanal	(D E. Beck) September, 1944

Rostral twice as wide as high; nostril between three small scales, the nasal supranasal and postnasal; frontonasal in broad contact with the rostral, broader than long; four supraciliaries; lower eyelid with a transparent disk; ear opening oval, with several short anterior lobules; seven supralabials; six infralabials; mental large. Scale rows around the middle of the body twenty-seven to thirty, 2 (27), 14 (28), 4 (29), 6 (30); lamellae on the underside of the fourth toe are two kinds, the proximal ones are broad and smooth, while the distal ones are slightly comprised and sharp edged, the proximal ones vary from sixty-one to seventy-five and the distal ones from

six to seven in number. The average body and tail length is from 120 to 138 mm.

The dorsal color is dark brown to black with three yellow to white stripes.

Captain Beck, while searching for coconut shells which contained water where mosquitoes may be breeding, found several shells which contained lizard eggs. Some of these eggs were placed in a pill box and in two days, two eggs had hatched. These lizards and some of the unhatched eggs and shells were preserved. They are listed under No. 7255. One shell which is in perfect shape, from which a lizard hatched and escaped from a hole 4 mm. in diameter in the side of the egg, is 11 mm. in length and 7 mm. in diamenter; one other shell is 14 mm. in length and 7 mm. in diameter. The two young lizards were preserved two days after hatching, one of them has a length of 59 (21 + 38) mm. and the other 58 (22 + 36) mm. It would appear that the young lizards are about one half the adult length at the time of hatching.

EMOIA NIGRUM (H. and J.)

Hombron and Jacquinot, Voy. au Pole Sud. Rept. 1842, p. 11.

BYU 6965, 6919, 7001	Guadalcanal	(D E. Beck) May, 1944 (J. Chattin)
BYU 7081, 7094, 7097-99	Guadalcanal	(I. Johnson) August, 1944 (H. Hawkins) August, 1944
BYU 7100, 7106-8, 7295	Guadalcanal	(E. Reimschiissel) July, 1944
BYU 7296, 7766, 8888	Guadalcanal	(D E. Beck) September, 1944

Rostral two-thirds as high as wide, supranasal small; nostril between prenasal, postnasal, and supranasal; four supraoculars; frontonasal in contact with the rostral; prefrontals and frontal combined length equal to length of frontoparientals and interpariental; transparent disc in lower eye lid; six to seven supralabials, the fifth one larger and beneath the eye; six infralabials; mental, submental and first pair of chin shields about equal in length. Scales smooth, dorsals largest, thirty-one to thirty-seven around the middle of the body; lamellae thirty-one to thirty-six on under surface of fourth toe. Average length of eight specimens is 236 (87 + 149) mm.

Color dark brown above and light pink to cream below in adults. In young specimens the back is golden to light brown in color.

The following is from Beck's notes; "Chattin and I caught these specimens in a coconut grove. They were first observed in a grassy area and then caught as they tried to escape under scales of a coconut tree which was in the process of decay."

CHECK LIST OF SOLOMON ISLANDS AMPHIBIANS AND REPTILES

Synoptic studies of the amphibians and reptiles of the Solomon Islands have been made by Boulenger, 1884-90; Barbour, 1921; Kinghorn, 1928; Burt, 1932; and Schmidt, 1932. Aside from the above are many recent, scattered comments and descriptions of species of the fauna of this archipelago. In making this study, I have found that the following list has been of great help. It is presented with no claim to completeness, but with the hope that it may be of some value to future students of the amphibians and reptiles of this area.

AMPHIBIA

Family Bufonidae

GENUS and SPECIES	LOCALITY — ISLANDS
BUFO Laurenti, Syn. Rep. 1768, p. 25	
1. MARINUS (Linnaeus)	Guadalcanal.

Family Hylidae

HYLA Laurenti, Syn. Rept. 1768, p. 32	
2. THESAURENSIS Peters *macrop* Blgr. *lutea* Blgr. *solomonis* Vogt	Guadalcanal, Mono, Bougainville, Fauro, Isabel, New Georgia, Russell, Tulagi, Malaita.
PALMATORAPPIA Ahl, S.B. Ges. Naturf. Fr. Berlin, p. 113, 1927.	
3. SOLOMONIS (Sternfeld)	Buka.

Family Ranidae

CERATOBATRACHUS Boulenger Proc. Zool. Soc. London, p. 212, 1884.	
4. GUENTHERI Blgr.	Guadalcanal, Russell, Florida, Bougainville, Choiseul, Kulambangara, Mono, Ronongo, Shortland, Vella Lavella.
CORNUFER Tschudi, Mem. Soc. Sc. Nat. Neuchatel, II, p. 28, 1839.	
5. CORRUGATUS A. Dum.	Bougainville, Choiseul, Ronongo, Mono.

6. NECKERI Brown and Myers	Bougainville.
7. GUPPYI (Blgr.)	Florida, Guadalcanal, Isabel.
RANA Linnaeus, Syst. Nat. 10 Ed. p. 210, 1758.	
8. PAPUA NOVAEBRITANNIAE Werner	Guadalcanal, Bougainville.
9. KREFFTI Blgr.	Mono, Bougainville.
DISCODELES Boulenger, Ann. Mag. Nat. Hist (9) I, p. 238, 1918.	
10. BUFONIFORMIS Blgr. *opisthodon* Blgr.	Bougainville, Fauro, Choiseul, Mono, Rendova, Ronongo.
11. GUPPYI Blgr. Fide W. C. Brown, manuscript.	Isabel, Florida, Treasury, Bougainville, Kulambangara.
PLATYMANTIS Gunther, Cat. Batr. Sal. Brit. Mus. 90, 93, 1858.	
12. SOLOMONIS Blgr.	Isabel.
13. PAPUENSIS WEBERI Schmidt	Tulagi, Guadalcanal.
14. MYERSI Brown	Bougainville.
HYPSIRANA Kinghorn, Rec. Austral. Mus. XVI, p. 130, 1928.	
15. HEFFERNANI Kinghorn	Isabel.
BATRACHYLODES Boulenger, Proc. Zool. Soc. London, p. 337, 1887.	
16. VERTEBRALIS Blgr. *chaperina friedericii* Sternfeld	Russell, Florida, Isabel. Buka

REPTILIA

Squamata - Serpentes

Family Typhlopidae

TYPHLOPS Schneider, Hist. Amph., II, p. 339, 1801.	
17. ALUENSIS Blgr. *T. philococos* Werner	Alu, San Cristobal, Isabel, Tulagi, Guadalcanal, Malaita, Ronongo.
18. BECKI Tanner	Guadalcanal.
19. OLIVACEUS REDUNCUS Barbour	San Cristobal, Guadalcanal.
20. CUMINGII MANSUETUS Barbour	San Cristobal.
21. INFRALABIALIS Waite	Malaita, Guadalcanal.
22. ADAMSI Tanner	Guadalcanal.
23. BERGI Peters	New Georgia.
24. SOLOMONIS Parker	Bougainville.

Family Boidae

ENYGRUS Wagler, Syst. Amph. p. 166, 1830.

25. CARINATUS Schneider — Santa Ana, San Cristobal, Guadalcanal.
26. AUSTRALIS (Montrouzier) — San Cristobal, Santa Ana.
27. BIBRONII H. and J. — Solomon Islands.
28. ASPER (Gunther) — Bougainville.
    Erelophis asper Gunther

Family Colubridae

CHERSYDRUS Cuvier, Reg. Anim. II, p. 75, 1817.

29. GRANULATUS Schneider — Malaita, Isabel.

BOIGA Stejneger, Proc. Biol. Soc. Wash. XV, p. 15, 1902.

30. IRREGULARIS (Merrem) — Bougainville, Florida, Guadalcanal, Isabel, Mono, Ronongo, Narovo, Rendovo.
    Coluber irregularis Merrem
    Dipsadamorphius irregularis Blgr.
    Boiga irregularis Stejneger

AHAETULLA Link, Beschr. Nat. Samml. Rostock, (2), 78, 1807.

31. CALLIGASTER (Gunther) — Guadalcanal, Ugi, Bougainville, Choiseul, Fauro, Florida, Gizo, San Cristobal, Rendova.
    Dendrophis calligaster Gunther
    Dendrophis salomonis Gunther. — Malaita.

MICROPECHIS Boulenger, Brit. Mus. Cat. Snakes, III, p. 347, 1896.

32. ELAPOIDES (Boulenger) — Florida.
    Hoplocephalus elapoides Blgr.

DENISONIA Krefft, Proc. Zool. Soc. London, p. 321, 1869.

33. PAR (Blgr) — Guadalcanal, Isabel, Faro.
    Hoplocephalus par Blgr.
    Hoplocephalus melanurus Blgr.
    Denisonia melanurus Blgr.
34. WOODFORDII (Blgr.) — New Georgia, Rendova.
    Hoplocephalus woodfordii Blgr.
    Denisonia woodfordii Blgr.

LATICAUDA Laurenti, Syn. Rept. p. 109, 1768.

35. COLUBRINA Schneider — Bougainville, Buka, Isabel, Guadalcanal, San Cristobal, Choiseul.
    Hydrus colubrinus

Schneider
Platurus colubrinus Blgr.

36. CROCKERI Slevin — Rennell.

PELAMYDRUS Stejneger, Proc. U.S. Nat. Mus. XXXVIII, p. 111, 1910.

37. PLATURUS Linnaeus — Solomon Islands.
Anguis platura L.
Hydrus platura Blgr.

PARAPISTOCALAMUS Roux, Vehr. Naturf. Ges. Basel, 45, p. 78, 1934.

38. HEDIGERI Roux — Bougainville.

HYDROPHIS Latreille, Suite a Deterville Ed. Buffon, Rept., IV, p. 193, 1801.

39. CYANOCINCTUS Daudin — Guadalcanal.

Loricata

Family Crocodylidae

CROCODYLUS Gronovius, Zooph., I, 10, 1763.

40. POROSUS Schneider — Guadalcanal, Isabel.

Squamata - Sauria

Family Agamidae

GONOCEPHALUS Kaup, Isis (Oken) p. 590, 1825.

41. GODEFFROYI (Peters) — Bougainville, Santa Ana, San Cristobal.
Lophura godeffroyi Peters

Family Gekkonidae

GYMNODACTYLUS Boulenger, Brit. Mus. Cat. Liz. I, p. 22, 1885.

42. PELAGICUS (Girard) — Guadalcanal, Isabel.

43. LOUISIADENSIS De Vis — Solomon Islands.
Gymnodactylus loriae Blgr.
G. olivii Garman

GEHYRA Gray, Proc. Zool. Soc. London, II, p. 100, 1834.

44. OCEANICA (Lesson) — Bougainville, Mono, Guadalcanal, San Cristobal.
Gehyra vorax Girard.

45. MUTILATA Wiegm. — Buka.

LEPIDODACTYLUS Fitzingen, Syst. Rept. p. 98, 1843.

46. LUGUBRIS (Dum. and Bibr.) Guadalcanal.
47. GUPPYI Blgr. Guadalcanal, Faro, Isabel, Whitney.
48. WOODFORDII Blgr. Faro, Guadalcanal

GEKKO Laurenti, Syn. Rept. p. 43, 1768.

49. VITTATUS Houttuyn Guadalcanal, Santa Ana, Bougainville, Ugi, New Georgia.

PSEUDOGEKKO Taylor, Bur. Sci. Publ. No. 17, p. 103, 1922.

50. SHEBAE Brown and Tanner Guadalcanal.

Family Varanidae

VARANUS Merrem, Tent. Syst. Amph. p. 58, 1820.

51. INDICUS (Daudin) Guadalcanal.
Tupinambus indicus Daudin

Family Scincidae

CORUCIA Gray, Proc. Zool. Soc. London, p. 217, 1885.

52. ZEBRATA Gray Guadalcanal, Ugi, Santa Ana, Isabel.

TRIBOLONOTUS Dumeril and Bibron, Erp. Gen. V, p. 346, 1839.

53. PONCELETI Kinghorn Solomon Islands.

PEDIPORUS Roux, Verh. Naturf. Ges. Basel, 41, p. 129, 1930.

54. BLANCHARDI (Burt) Choiseul.
Tribolonotus blanchardi Burt
55. SCHMIDTI (Burt) Beagle, Guadalcanal, Bougainville.
Tribolonotus schmidti Burt

DASIA Gray, Ann. Nat. Hist., II, p. 331, 1839.

56. SMARAGDINUM PERVIRIDIS Barbour Isabel, New Georgia, Malaita, Guadalcanal, Bougainville.

RIOPA Gray, Ann. Nat. Hist. II, p. 332, 1839.

57. ALBOFASCIOLATA (Gunther) Guadalcanal, Faro, Malaita, Ugi, San Cristobal.
Lygosoma striato-fasciatum Ogilby.

LYGOSOMA Hardwick and Gray, Zool. Journ. III, (10), p. 228, 1857.

58. (SPHENOMORPHUS) CRANEI Schmidt — Isabel, Guadalcanal.
59. (SPHENOMORPHUS) BIGNELLI Schmidt — Kulambangara, Guadalcanal.
60. (SPHENOMORPHUS) TAYLORI Burt — Bougainville.
61. (LYGOSOMA) SOLOMONIS Blgr. — Malaita, Faro, Isabel, Guadalcanal.
62. (LYGOSOMA) WOODFORDI Blgr. — San Cristobal, Ugi, Faro.
63. (LYGOSOMA) CONCINNATUM Blgr. — Guadalcanal, Faro, New Georgia, Malaita, Tulagi, Isabel.
    Sphenomorphus concinnatum Blgr.
    Lygosoma (Otosaurus) wolfi Sternfeld
64. (LEIOLEPISMA) ANOLIS (Blgr.) — Guadalcanal, Santa Ana, Shortland, Santa Cruz, Malaita, San Cristobal, Ugi, Treasury.
    Lipinia anolis Blgr.
    Lygosoma anolis Blgr.
    Leiolepisma anolis Blgr.
65. (LEIOLEPISMA) NOCTUA Lesson — Guadalcanal, New Georgia.

EMOIA Gray, Cat. Lizards Coll. Brit. Mus., p. 95, 1845.

66. CYANOGASTER (Lesson) — Guadalcanal, San Cristobal, Santa Ana, Ugi, Isabel, Buki.
    Scincus cyanogaster Lesson
    Lygosoma cyanogaster Blgr.
67. CYANURA (Lesson) — Guadalcanal, Ugi, San Cristobal, Malaita.
68. NIGRUM Hombrom and Jacquinot — Guadalcanal, New Georgia, Ugi, San Cristobal.
    Eumeces niger H. and J.
    Lygosoma nigrum Blgr.
69. MANNI Brown — San Cristobal.
70. WHITNEYI Burt — Shortland.
71. FLAVIGULARIS Schmidt — Isabel.
72. WERNERI (Vogt) — Kulambangara.
    Lygosoma Cyanurum Vogt
    Lygosoma Werneri
    Triviale Schuz
73. SANFORDI Schmidt — Fauro.

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NEW COUNTY RECORDS OF SALIENTIA AND A SUMMARY OF KNOWN DISTRIBUTION OF CAUDATA IN OKLAHOMA

ARTHUR N. BRAGG[1] AND W. F. HUDSON

For several years one of us has traveled over eastern Oklahoma with the purpose of surveying the amphibian fauna. During the spring of 1951, the other took several trips to parts of this region as well as to portions of western and southwestern Oklahoma with the object of filling gaps in the records of the earlier work. We here pool our collections which seem to represent new county records of Salientia and take the opportunity to summarize the known county distribution of Caudata whether based on new records or not. We do this to get the many scattered records in the literature all in one place.

SALIENTIA

1. *Bufo cognatus* Say. Taken in Roger Mills, Pontotoc, and Johnston Counties. In the last two, it has been expected in "prairie islands" for some time but these specimens are the first reported from either.
2. *B terrestris charlesmithi* Bragg[2]. Washington County (adults ta-taken); heard calling in Noble County.
3. *Microhyla carolinensis olivacea* Hallowell. Adults collected in Jackson, Johnson, and Stephens Counties, each confirming a former calling record.[3] Also heard calling in Cotton County.
4. *Pseudacris clarki* Baird. Taken in Stephens County, confirming a calling record; heard calling in Grady and Cotton Counties.
5. *Ps streckeri* Wright and Wright. Stephens County.
6. *Ps. triseriata* (Wied). Stephens County: these are the first adults taken so far west in Oklahoma.
7. *Rana brachycephala* Cope. Adults from Stephens County confirm earlier sight and calling records.
8. *Rana catesbeiana* Shaw. Adults taken in Jefferson County confirming sight records and in Choctaw County.
9. *Rana clamitans* Latr. Choctaw County.
10. *Spea bombifrons* Cope.
    Adults taken in Stephens and Noble Counties, tadpoles in Jefferson County.

CAUDATA

1. *Ambystoma annulatum* Cope. Adair County.

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1 Supported by the Dept. of Zool., the Oklahoma Biol. Surv. and the University Museum, University of Oklahoma, Norman.

2 This toad is the one reported formerly as **B. t. americanus** Holb. In a separate paper it is being described under the above name.

3 For one of these we thank Mr. Louis Bouchard who collected a single specimen.

2. *A. maculatum* Shaw. Cherokee, Choctaw, Delaware, La Flore, McCurtain and Pushmataha counties certainly have local populations. It is considered probable in many other counties of the state.
3. *A. opacum* (Gravenh.) This species is very common in low, heavily wooded areas, especially near streams at least in Choctaw, Latimer, Mc Curtain and Pushmataha counties.
4. *A. talpiodium* (Holb.) Reported in Latimer and McCurtain counties but we have not personally collected it in Oklahoma.
5. *A. texanum* Matthes. This salamander is very abundant from east central Oklahoma eastward. It is known specifically from the following counties, mostly from our own collections; Adair, Choctaw, Cleveland, Cherokee, Atoka, Cotton, Craig, Haskell, Osage, Pawnee, Payne, Pottawatomie, Okfuskee, Hughes, Tulsa, Rogers, Mayes, Wagoner, Muskogee, Sequoyah, Mc Intosh, Pittsburg, Le Flore, Pushmatha and Mc Curtain.
6. *A. tigrinum mavortium* Baird. This is the only salamander known on the western plains of Oklahoma. It is very abundant over the western half of the state where it breeds in ditches, tanks, and playas during spring and summer rains. Larvae often metamorphose in July following a spring breeding period but in some places some of the larvae are neotenic. In the gypsum hill country of western Oklahoma, the larvae are often light cream colored with a black-fringed tail and golden gill bars. In central Oklahoma they are more often a mottled green and quite dark. In the same gypsum waters, tadpoles of spadefoots (*Spea bombifrons* and *S. hammondii*) show a similar variation in color. It has not been fully established as to why the color is so consistantly light in some waters. The presence of gypsum is a suspected cause but may be only coincidental.

   The subspecies is known in the following counties: Cimarron, Texas, Beaver, Harper, Woodward, Ellis, Roger Mills, Custer, Beckham, Greer, Harmond, Kiowa, Tillman, Caddo, Commanche, Cotton, Stephens, Murray, Cleveland, Oklahoma, Pottawatomie, Kay, and Osage.
7. *A. tigrinum tigrinum* Green.
   Even though supposedly present throughout eastern Oklahoma (Bishop, 1943), only one specimen is known to us from Oklahoma. This was taken in a forest of southern pine just south of Tom, Mc Curtain county in the very northern edge of the Austroriparian life zone of Blair (1950).
8. *Amphiuma means tridactylum* Cuvier. Known in Mc Curtain county, at present from a single specimen only, recently reported. For several years, stories of local residents have indicated that it is quite common from Broken Bow southward.
9. *Desmognathus fuscus brimleyorum* Stej. Known in the Le Flore, Pushmataha, and Mc Curtain counties along rocky streams in hilly country.
10. *Eurycea griseogaster* Moore and Hughes. Locally abundant about small streams and intermittant springs in Adair, Cherokee, Delaware, and Sequoyah counties. In two regions, local areas have been watched through the months of February through July in an attempt to learn something of the breeding activities. Young larvae have been found from February through June and older ones from mid June into early July. From this it seems likely that individuals differ in their time of breeding and that most eggs are laid in fall or early winter. Eggs have never been found. A pecularity of the very young larvae is their habit of lying on ledges over which water one to four inches in depth flows slowly and, when disturbed,

darting quickly into cracks or under gravel. They have been seen lying in the open many times during both daylight and darkness.

11. *Eurycea longicauda melanoplura* (Cope) Common in cave mouths and about springs in Le Flore, Adair, Cherokee, Mayes, Delaware, and Ottawa counties.
12. *E. multiplicata* (Cope) this species is very abundant locally along many tiny streams, especially if cool water is running over limestone rocks in Adair, Cherokee, Delaware, Choctaw, Le Flore, Pushmataha, Latimer, and Mc Curtain counties. Occasionally local variations in this species occur which are quite puzzling since some individuals closely approach *E. griseogaster* in appearance. Very dark individuals also sometimes occur.
13. *E. tynerensis* Moore and Hughes. Known now from Mayes and Cherokee counties as well as from the type locally in Tyner Creek, Adair county. It is sometimes abundant in pools and in the gravel at the lower ends of ripples in Tyner Creek, but at other times a thorough search has failed to reveal it.
14. *Necturus maculosus maculosus* (Raf.) Only a few specimens of this form have actually be collected in Oklahoma although it has long been known to occus in northeastern counties. A specimen from the Deep Fork River, Creek county, was recently taken by Mr. Jack Adair. Earlier records are from Tulsa, Rogers, Nowata, Delaware, Mayes, Cherokee, Adair, Haskell, and Latimer counties. It occurs in Grand Lake and, therefore, presumably in Grand River which was dammed to form it and is known as the Illinois river, both in Oklahoma and Arkansas.
15. *Plethodon cinereus anausticlavius* Grobman. A few specimens have been taken in Sequoyah, Adair, and Cherokee counties. None are known south of the Arkansas river where it is presumably replaced by *P. c. serratus* (q.v.)
16. *Plethodon c. serratus* Grobman. As mentioned above, this form is generally supposed to replace *P. c. anausticlavius* in the Ouachita Mts. south of the Arkansas River. It has long been known in Le Flore and Mc Curtain counties. We have recently taken a typical specimen in the Ozark Hills of Cherokee county, well north of the Arkansas, which fact does not fit with the theoretical expectation.
17. *Plethodon glutinosus glutinosus* (Green). Abundant in Adair, Cherokee, Delaware, Ottawa, Le Flore, Mc Curtain, and Sequoyah counties. It seems to prefer valleys along streams where it hides beneath leaves, rocks, logs, etc. We have found it locally only in densely wooded areas. Some years ago, individuals were very abundant in the woods of the valley floor above Little River (Mc Curtain county) in May and June, very near the river. At another time in February and March two experienced collectors failed to find a single specimen here; but the animals were found on the steep sides of the valley, well above the river. Subsequent observations suggest that this salamander has a seasonal movement here upward away from the river in winter and early spring, downward toward the river in the hotter and drier later spring and summer. We have not observed them here in late summer, autumn or early winter.
18. *Plethodon ouachitae* D. and H. Certain only in Le Flore county near the Arkansas line. Dundee (1947) reported it from Mc Curtain county but Pope and Pope (1951) declare Dundee's specimen to represent an undescribed form.
19. *Siren intermedia nettingi* Goin. Known from Mc Curtain and Pushmataha counties.
20. *Diemictylus viridescens louisanensis* (Walterst.) Common locally in Mayes, Wagner, Cherokee, Adair, Le Flore, and Mc Curtain coun-

ties; very recently reported from Tulsa county. Eggs and hatching larvae have been collected in May and breeding adults have been taken in April, May, and June. This suggests a breeding season of several months. Since several females have been found while clasped by males (usually by one, sometimes by two at once) it seems likely the breeding pattern is similar to that of the eastern form (Bishop, 1943).

21. *Typhotriton nereus* Bishop. Larvae are very abundant in spring-runs and gravelly streams in Ottawa, Mayes, Delaware, and Adair counties. Very large larviform individuals which are sometimes found suggest, but do not prove, neotemy.
22. *T. spelaeus* Stej. Larvae are abundant in springs and in streams issuing from caves in Ottawa, Mayes, Cherokee, and Adair counties. Adults had never been taken in Oklahoma prior to 1951, although we have visited caves several times in search of them. Blair (1951) has just reported adults from a cave habitat in Delaware county.

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TWO NEW ANTS FROM WESTERN NEVADA
(Hymenoptera, Formicidae)

MARION R. SMITH
Bureau of Entomology and Plant Quarantine
Agricultural Research Administration
United States Department of Agriculture

Since the ant fauna of Nevada is virtually unknown the two new species described herein are of more than ordinary interest. Both were sent me by Dr. Ira La Rivers of the University of Nevada who collected them in the general region of Pyramid Lake, Washoe County, Nevada. One is a very distinct form of honey ant *(Myrmecocystus)* which I have named *pyramicus* because of the pyramid-like structure of the epinotum. The other is a harvesting ant *(Veromessor)* which, though related to *pergandei* (Mayr), is definitely different. This new form has been named *lariversi* in honor of its collector. Illustrations of *Myrmecocystus pyramicus* are included.

MYRMECOCYSTUS **PYRAMICUS** SMITH, new species

(Figs. 1, 2, 3,)

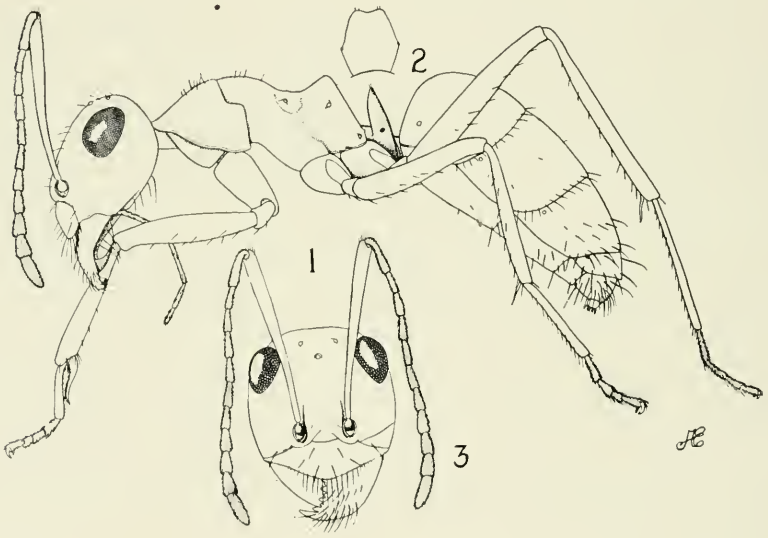
Worker—Length 4.8 mm.

Mandible 8-toothed, the largest of the teeth being the first, second, fourth, sixth and last. Compound eye as in the *mexicanus* group: Large, protuberant, and with many facets, placed very close to the posterior corner of the head, its greatest diameter approximately one and one-half times the length of the first funicular segment. Ocelli extremely small. In profile, the pronotum and much of the mesonotum rather evenly and strongly convex, the posterior fourth to the posterior third of the mesonotum distinctly impressed; base of epinotum sharply ascending from meso-epinotal suture to meet the flat, declivous surface of the epinotum in a rather broad, bluntly rounded angle or "pyramid-like" structure; declivous surface approximately twice the length of the basal surface. In profile, the petiole high (higher than the epinotal spiracle), with a weakly convex anterior surface and a flat posterior surface, the two surfaces meeting above to form a strongly compressed (anteroposteriorly), sharp superior border; viewed posteriorly the petiole with dorsally converging sides and the superior border with a distinct emargination.

Dorsal and anterior surface of head and mandibles bearing a number of long, erect hairs, those on the anterior border of the clypeus unusually long. Lower surface of head with ammochaetae and

lower surface of mandible with long hairs. Thorax almost destitute of erect hairs except for a small number (usually about six) on the pronotum and a smaller number on the mesonotum. Petiole also practically devoid of hairs, occasionally an erect hair or two on the superior border. Coxa with erect hairs; erect hairs also on the flexor surfaces of the femur, tibia and tarsus. Posterior border of each of the gastric segments with a row of hairs; also a number of short, sparse, erect hairs elsewhere on the gastric segments; apex and ventral surface of gaster with longer and more numerous hairs. Pubescence sparse, fine, closely appressed, not obscuring the ground surface, thickest and most apparent of the gaster.

Body usually subopaque in general appearance, but in some lights certain parts are shining, this being especially true of the dorsal surface of the head. Color a sordid light or yellowish brown with the thorax and antennae lighter than the head and gaster.



(Figs. 1, 2, 3)

Myrmecocystus pyramicus, new species. Fig. 1. Profile of worker. Fig. 2. Posterior view of petiole. Fig. 3. Anterior view of head. (Illustrations by Miss Addie Egbert.)

TYPE LOCALITY: Nevada Dominion Mine, Pymarid Mining District, five miles west of Mullen Gap (Pyramid Lake), north end of Pah Rah Mountains (Nevada Highway 33), Washoe County, Nevada. The ants were collected by Ira La Rivers on April 7, 1951, from a colony in a small, open mound nest in a sand clearing of *Artemisia tridentata*, where the females and males were beginning to swarm near sundown.

Described from a holotype and 37 paratype workers. The holotype and 25 paratype workers have been placed in the collection of the United States National Museum under U. S. N. M. No. 61265. The remaining paratypes are in the collection of Dr. La Rivers. The five male and ten females have not been described as they do not offer good characters for recognition.

The paratypes vary especially in size, pilosity, and extent of the development of the "pyramid-like" structure of the epinotum. The range in size of this form cannot yet be positively stated on the basis of the few specimens examined. It is thought, however, to approach that of *navajo* Whlr., the major worker of which is almost 5 mm. in length. The range in length of my *pyramicus* series is approximately 3 to 5 mm. The pilosity of the thorax and petiole may vary from almost no erect hairs to a few as stated in the above description.

This new form belongs to the *mexicanus* complex as evidenced by the large eyes and their placement, by the small ocelli, and by the light to yellowish brown color of the body. In Creighton's 1950 publication, Ants of North America (Harvard Univ., Mus. Comp. Zool. Bul. 104:441) this ant keys to couplet four which includes *navajo* and *mojave*. Specimens have been carefully compared with cotypes of both these forms. From *navajo*, to which it is apparently most closely related, *pyramicus* can be distinguished by the dentition of the mandibles, pilosity of the body, and the shape of the epinotum and petiole. *M. pyramicus* has eight instead of nine teeth on the mandibles, and a pyramidshaped instead of a convex epinotum. The scape is free of erect hairs and the thorax and petiole are also either free of erect hairs or only have a very few, whereas in *navajo* there are numerous erect hairs on both the scape and thorax. The petiole of *pyramicus* is strongly compressed anteroposteriorly and the superior border is sharp and usually has a distinct emargination. *Navajo* has a rather thick petiole (anteroposteriorly) and the superior border is thick and blunt. *M. pyramicus* seems to be one of the most easily recognized forms of this genus in North America.

The shape of the epinotum readily distinguishes it from any other form, but to supplement this there are other good characters, such as color, pilosity, dentition of the mandibles, size and placement of the eyes, and shape of the petiole.

Apparently *pyramicus* is a nocturnal ant which lives in very arid regions. Its food is most likely honeydew and the flesh of small arthropods. No repletes are yet known.

VEROMESSOR **LARIVERSI** SMITH, new species

Worker—Length 5 mm.

Head, exclusive of the mandibles, subrectangular, with a weakly convex, almost straight posterior border. Antenna 12-segmented; scape slender, curved at base, enlarged apically, the apex clearly surpassing the posterior border of the head; base of the scape lacking a lobe or other enlargement as in some species of *Veromessor;* funiculus enlarged apically but not forming a clearly-defined club. Eye large, convex, strongly protuberant, placed approximately its greatest diameter from the base of the mandible, without the sharp antero-ventral angle of *pergandei.* Clypeus convex, lacking the median tooth on the anterior border as in *pergandei.* Mandible large, subtriangular, with two large apical and five or six somewhat less distinct teeth. Thorax, in profile, with a strongly convex promesonotum. Approximately the posterior half of the mesonotum with a distinct impression which is clearly longer than deep. Meso-epinotal constriction well defined. Epinotal spine subtriangular, short, acutely pointed, much less than half the length of the basal surface of the epinotum. Legs rather long and slender, without noticeably incrassated femora and tibiae. The distinctly concave anterior surface of the petiolar node meeting the posterior surface of the node in a bluntly rounded angle; antero-ventral surface of the petiole with a very poorly defined, vestigial tooth. Petiole viewed anteriorly somewhat violin-shaped. Postpetiole, from above, subcampanulate, broadest posteriorly. Gaster, viewed dorsally, oval, without apparent humeral angles.

Frontal region of head with fine, longitudinal striae or rugulae. Cheeks with coarse, longitudinal rugulae, those around the antennal foveae more or less concentric. Remainder of head with an obscure, delicate shagreening. Punctures on head sparser and less visible than in *pergandei.* Pronotum with transverse rugulae in addition to the shagreening. Mesopleuron and side of epinotum rugulose-

punctate. Petiole and postpetiole delicately shagreened.

Ventral surface of each side of head and also ventral side of each mandible with remarkably long ammochaetae as in *pergandei*. Anterior border of clypeus with a row of long, curved hairs. Dorsal surface of body with rather numerous, erect, yellowish hairs of variable length, many of these unusually long. Hairs on antennal scape short, somewhat appressed.

Head, thorax, petiole and postpetiole brown, gaster darker; eyes and mandibular teeth black.

TYPE LOCALITY: Nevada Dominion Mine, Pyramid Mining District, Mullen Gap (five miles west of Pyramid Lake), Washoe County, Nevada, May 8, 1951, nesting in sand, Ira La Rivers.

Described from a holotype and 38 paratype workers. The holotype and 25 paratypes have been placed in the collection of the United States National Museum under U. S. N. M. No. 65266. The remaining paratypes have been returned to Dr. La Rivers.

Paratypes vary in size and color. The range in length is from 3.8 to 5.2 mm. The color of some specimens, especially of the smallest workers (which may be callows), is light brown. A small infuscated spot is present on the vertex of some individuals and absent on the vertex of others.

This new form has been carefully compared with types of all other North American *Veromessor*. In the Wheeler and Creighton key to *Veromessor* (1934, Proc. Amer. Acad. Arts and Sci. 69:361) it keys to couplet three and in Creighton's North American Ants (l.c., page 158) it keys to couplet two. In each case the couplet includes the same forms, *pergandei* and *stoddardi*. *V. lariversi* is more closely related to *pergandei* than to any other of our *Veromessor*. It differs especially from that species in the more convex and protuberant eye (which lacks the distinct antero-ventral angle of *pergandei)*, the absence of a tooth-like process on the middle of the anterior border of the clypeus, the longer and more slender antennal scape (the scape of *pergandei* fails to attain the posterior border of the head in some individuals and does not surpass it in others), the coarser sculpture, different color (piceous brown to jet black in *pergandei* and the longer and more slender, subcampanulate postpetiole.

Although little is known about the biology of *lariversi* it is assumed that because of close resemblance of the species to *pergandei*,

this new form will also be found capable of living in very arid areas of high temperature. No doubt, it too feeds largely on seeds. Besides *lariversi*, *andrei* (Mayr) is the only other *Veromessor* that has been reported from Nevada.

THE CERAMBYCOID SEMI-AQUATIC COLEOPTERA OF THE NEVADA AREA

IRA LA RIVERS
Biology Department, University of Nevada, Reno.

The following pages constitute the fifth in a series dealing with the aquatic and semi-aquatic Coleoptera of Nevada and its immediate environs[1]. The group to be here considered is a small, relatively little known segment of a large, familiar family—the most pressing need at the present is for more penetrating investigation of the life-histories of these semi-aquatic aberrants of the family, and it is hoped that this resumé of the species known or expected for the Nevada area will call some small attention to the problem.

CERAMBYCOIDEA

Chrysomelidae

A small number of species of this large, herbivorous family are intimately associated with aquatic plants, either boring into stems and roots below water, or feeding on exposed or submerged leaves. Host plants are such common and wide-spread species as pickerel weed *(Pontedaria cordata)*, pondweed *(Potamogeton* spp.). pondlily *(Nymphaea* spp.—*Nuphar* spp.), bur-reed *(Sparganium* spp.), arrowhead *(Sagittaria* spp.), duckweed *(Lemna* spp.), bulrushes *(Scirpus* spp.), cat-tails *(Typha* spp.) and various sedges.

The larvae obtain oxygen by digging into the plant tissues underwater and freeing intercellular oxygen. When ready to pupate, they spin tough, water-and-air-tight cocoons, attached to the roots of underwater stems, and obtain needed oxygen by special structures which tap the plant surfaces to which the cocoons are attached. Adults of those species laying their eggs underwater are heavily provided with hydrofuge hairs, allowing the insects to take an adequate supply of air for their work beneath the surface of the water.

Keys to the semi-aquatic genera of Chrysomelidae occuring in the Nevada area.

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(B)—1950 (1949). Hydradephagous Coleoptera of the Nevada area, exclusive of the Dytiscidae. Bull. S. Calif. Acad. Sci. 48(3):129-140.

(C)—1950. The Staphylinoid and Dascilloid aquatic Coleoptera of the Nevada area. Great Basin Nat. 10(1-4):66-70.

(D)—1951. Nevada Dytiscidae (Coleoptera). Amer. Midl. Nat. 45(2):392-406.

(MacGillivray 1903)

ADULTS

1. Prothorax with a distinct thin lateral margin (Galerucinae) ..... (Galerucella)
——Prothorax without a thin lateral margin (Donaciinae) 2
2. Tarsi dilated, spongy beneath; fifth tarsal segment subequal to, or shorter than, the second and third segments together ..... DONACIA
——Tarsi not dilated—narrow, glabrous; the fifth tarsal segment distinctly longer than the second and third together ..... (Haemonia)

LARVAE

1. Dorsum of eighth abdominal segment without a pair of long spines; abdominal prolegs present (Galerucinae) ..... (Galerucella)
——Dorsum of eighth abdominal segment with a pair of pointed spines; abdominal prolegs wanting (Donaciinae) 2
2. Sixth and seventh abdominal tergites each with a double row of setae of the same length as those found on the other tergites; the supraspiracular setae always present .. DONACIA
——Sixth and seventh abdominal tergites each with a double row of setae, most of which are twice as long as those on the other tergites; the supraspiracular setae wanting .... (Haemonia)

Galerucinae

(*Galerucella* Crotch, 1873)

G. nymphaeae (Linné) 1758 is the only aquatic member known to me, breeding on *Nymphaea advena* and is holarctic in distribution. The larvae feed on the leaf epidermis.

Donaciinae

DONACIA Fabricius, 1775

Our species may be distinguished by Schaeffer's 1925 key; with modifications by Mead (1938):

1. Elytral sutural margin sinuate near apex; ocular orbits absent; first ventral segment of abdomen generally about as long as the three succeeding segments (Subgenus *Plateumaris)* 2
——Elytral sutural margin straight to apex; ocular orbits distinct; first ventral abdominal segment about as long or slightly longer than the four succeeding segments (Subgenus *Donacia)* 7
2. Hindfemora uniformly metallic with a moderate-to-large tooth ..... *(emarginata* Kirby, 1837)
——Hindfemora bicolored or entirely red, tooth variable in size 3
3. Hindfemoral tooth moderate-to-large in size ..... *germari*
——Hindfemoral tooth very small or absent 4
4. Prosternal sidepieces finely rugose, at least in anterior half, posteriorly more-or-less distinctly finely strigate-rugose .... *pusilla pyritosa*

——Prosternal sidepieces relatively coarsely strigate, at least posteriorly, anteriorly often strigate-rugose but then never finely so 5

5. Elytra lacking transverse, coarse rugae, intervals vermiculate-rugose (prothorax finely rugulose with moderately large punctures) ..... *(vermiculata* Schaeffer, 1925)

——Elytra with more-or-less distinct coarse rugae, intervals punctate, not vermiculate-rugose 6

6. Prothorax appearing longer than usual, very finely rugose or strigate-rugose, with or without moderately large punctures; lateral tubercle rather elongate; antennal segments 4-11 elongate ..... *(longicollis* Schaeffer, 1925)

——Prothorax as usual, rather short and less finely strigate-rugose, with large-to-small punctures; lateral tubercles not elongate; antennal segments shorter and nearly as in *pusilla* (= rather stout, segments 2-3 small, equal or subequal, terminal segments stouter) ..... *(dubia* Schaeffer, 1925)

7. Terminal abdominal segment truncate with a more-or-less deep impression at middle of apex (males) 8

——Terminal abdominal segment triangular and generally narrowly rounded at apex, without median depression (females).. 18

8. Hindtibiae at apex internally produced into a short, but distinct tooth (posterior femora with a large, somewhat compressed triangular tooth and a more-or-less distinct denticle in front of the tooth) ..... *(piscatrix* Lacordaire, 1845)

——Hindtibiae not produced apically into a tooth 9

9. Hindfemora long, extending to or beyond elytral apices 10

——Hindfemora decidedly shorter, never extending to elytral apices 12

10. Hindfemora not extending beyond elytral apices; posterior tooth rather long, acute, behind which is a serrate oblique ridge, the latter often reduced to a few denticles in small specimens; outer apical elytral angles obliterated, broadly rounded;anterior transverse impression of prothorax generally distinct ..... *(proxima)* .. 11

——Hindfemora extending well beyond elytral apices, armature as in *proxima;* outer apical angles of elytra distinct, though more-or-less narrowly rounded; anterior transverse impression of prothorax usually absent .... *(cincticornis* Newman, 1838)

11. Dorsum metallic blue, strial punctuation moderately coarse, punctures often greenish, median basal triangulate excavation usually indistinct ..... *(proxima proxima* Kirby, 1837)

——Dorsum metallic green and/or cupreous, strial punctuation coarse, basal triangulate excavation deep ..... *(proxima californica* Le Conte, 1861)

12. Hindfemora bearing two teeth, the inner occasionally very small, tubercle-like ..... *(pubescens* Le Conte, 1867)

——Hindfemora with only one tooth 13

13. Prothorax finely and densely punctate and pubescent; elytra without fine elevated sutural beed .....*hirticollis*

——Prothorax not pubescent, punctuation variable; elytra with distinct, elevated sutural beed 14

14. Head deeply narrowed behind; eyes small, not prominent; prothorax with impressed median line and moderately distinct lateral tubercles; elytra without coarse, transverse rugae, intervals relatively finely rugose from base-to-apex; last dorsal abdominal segment of both sexes generally

emarginate at middle of apex ..... *(distincta)* .. 15

——Head slightly narrowed behind; eyes moderately large, prominent; prothorax with or without impressed median line and lateral tubercles; elytra with more-or-less distinct coarse, transverse rugae, intervals often densely rugose from base-to-apex or smooth and feeble rugose in about basal half but more densely rugose towards apex; last dorsal abdominal segment of both sexes not or rarely feebly emarginate 16

15. Hindfemur clavate with a moderately large and acute tooth, apical third of elytra depressed ..... *(distincta distincta* Le Conte, 1850)

——Hindfemur less clavate with a very small obscure tooth, apical third of elytra curved ventrad ..... *(distincta occidentalis* Mead, 1938)

16. Form more convex and subparallel; elytra, viewed laterad, arcuately declivous towards apex; prothorax scarcely converging behind, lateral tubercles more-or-less distinct and median line always present; antennae generally stouter ..... *(tuberculifrons* Schaeffer, 1919)

——Form elongate; elytra subtriangular and, viewed laterad, flattened toward apen; prothoracic sides distinctly converging behind, lateral tubercles indistinct; median line rarely present; antennae more slender ..... *(subtilis)* .. 17

17. Abundant coarse transverse rugae on elytra; antennae slender; hindfemora clavate ..... *(subtilis subtilis* Kunze, 1818)

——Fine and dense strigate-rugous sculpturing on elytra, coarse transverse rugae sparse; antennae stouter; hindfemora less clavate ..... *(subtilis magistrigata* Mead, 1938)

18. Hindfemora unarmed below 19

——Hindfemora armed below with one or more teeth or tubercles 20

19. Elytra pubescent ..... *(pubescens* Le Conte, 1867)

——Elytra glabrous ..... *hirticollis*

20. Hindfemora armed below with one tooth and behind this an oblique serrate ridge (seen more plainly from an internal view), which latter is often reduced to one or more denticles 21

——Hindfemora below with one tooth but without an oblique ridge of denticles behind 23

21. Outer elytral apical angle distinct, but feebly rounded; anterior transverse impression of prothorax usually absent ..... *(cincticornis* Newman, 1838)

——Outer elytral apical angle not distinct, broadly rounded; anterior transverse impression of prothorax usually distinct ..... *(proxima)* .. 22

22. Dorsum metallic blue, strial punctuation moderately coarse, punctures often greenish, median basal triangulate excavation usually indistinct ..... *(proxima proxima* Kirby, 1837)

——Dorsum metallic green and/or cupreous, strial punctuation coarse, basal triangulate excavation deep ..... *(proxima californica* Le Conte, 1861)

23. Hindfemora bicolored or entirely rufous ..... *(piscatrix* Lacordaire, 1845)

——Hindfemora uniformly metallic 24

24. Form rather broad; head distinctly narrowed behind eyes, which are slightly smaller than in *subtilis,* but appear to be

more protruding; elytra without transverse, coarse rugae, intervals generally evenly and finely rugose from base-to-apex, laterally mostly with a rather broad, longitudinal, shallow impression; last dorsal abdominal segment emerginate at apex ..... *(distincta)* .. 25

——Form narrower and more elongate; head relatively feebly narrowed behind eyes which are moderately large and moderately prominent; elytra generally with more-or-less distinct transverse, coarse rugae, intervals moderately finely to moderately coarsely rugose from base-to-apex, at apex generally finer and denser, disc occasionally in about basal half or less smooth and shining, at sides and near apex more-or-less densely rugose 26

25. Hindfemur clavate with a moderately large and acute tooth, apical third of elytra depressed ..... *(distincta distincta* Le Conte, 1850)

——Hindfemur less clavate with a very small obscure tooth, apical third of elytra curved ventrad ..... *(distincta occidentalis* Mead, 1938)

26. Elytra shorter, more convex and parallel, when viewed laterad more-or-less distinctly arcuately declivous near apex; prothorax scarcely narrowing behind; median impressed line always distinct; lateral tubercules distinct, though not prominent ..... *(tuberculifrons* Schaeffer, 1919)

——Elytra more elongate, subtriangular, depressed and when viewed laterad flattened above near apex; prothorax distinctly narrowing from base-to-apex; median impressed line rarely present; lateral tubercles feeble and scarcely distinct, or absent ..... *(subtilis)* .. 27

27. Abundant coarse transverse rugae on elytra; antennae slender; hindfemora clavate ..... *(subtilis subtilis* Kunze, 1818)

——Fine and dense strigate-rugose sculpturing on elytra, coarse transverse rugae sparse; antennae stouter; hindfemora less clavate ..... *(subtilis magistrigata* Mead, 1938)

D. Germari Mannerheim 1843. Schaeffer (1925) gives the following record: "Nevada: 'Nev.' (Knab coll.)." The species is nationwide, and in other localities has been recorded from *Caltha palustris* (marsh marigold).

D. Pusilla Pyritosa Le Conte 1857. Again from Schaeffer (1925): "Nevada: 'Nev.' (Minn. Univ.)." The typical subspecies has been recorded from rushes, *Carex stricta* (sedge), and spiked maple.

D. Hirticollis Kirby 1837. Schaeffer records this from "California: Lake Tahoe (Mann.)" Since the lake lies in both California and Nevada, the species is certain to be found in the latter state. Recorded hosts are *Nuphar polysepalum* and *Potamogeton* spp.

The adjacent Californian *D. piscatrix* inhabits the flowers of *Nuphar* spp., the yellow waterlily. *D. pubescens* is known from "California: Lake Co. (Van Dyke)" (Schaeffer 1925), and seems

to be a northern form. It has been found on pickerel weed, and is the only North American species with pubescent elytra. *D. distincta occidentalis* was described from California, as was *D. subtilis magistrigata;* the typical subspecies of the latter has been found on *Sparganium* and goldenrod. *D. tuberculifrons* is known from Utah and points east and is recorded from yellow pondlily, bulrushes *(Scirpus* spp.) and *Sparganium. D. emarginata* occurs east of Nevada, one of the nearest localities being Utah's Great Salt Lake (Van Duzee specimens). *D. emarginata pacifica* Schaeffer 1925 was described from the California Sierras with no host data. *D. dubia* is known from Idaho, while *D. vermiculata* was described from California, and may perhaps be only an aberrant *D. longicollis.*

The only available key to larvae (MacGillivray 1903) includes but three of the above-listed species, and is appended for the aid it may offer in evaluating larval characters:

1. Supraspiracular setae of the first five abdominal segments extending caudad as far as the caudal margin of the posterior setae ..... *(emarginata)*
——Supraspiracular setae of the first four abdominal segments not extending caudad as far as the front margin of the posterior tergal band of setae 2
2. Sternal setae of the fifth abdominal segment divided longitudinally by a mesal line into two groups; the posterior sternal setae of the midthorax undivided ..... *(cincticornis)*
——Sternal setae of the fifth abdominal segment not divided; the posterior sternal setae of the mesothorax not divided longitudinally into two groups ..... *(subtilis)*

The general lifehistory details below are from MacGillivray's work in New York (1903):

The species of *Donacia* exhibited certain differences in egglaying, some laying their eggs on plant stems, others on the underside of floating leaves and others along the edge of leaf sheaths. Eggs hatched in about 10 days, and "the young larvae find their way to the bottom of the pond and among the ooze and attach themselves to the underground stems of the yellow pondlily. Numerous underground stems of the white pondlily were examined, and not a single one was found with the larvae of Donacia attached to it, or with any indications of where larvae had been feeding on it, though in most cases the stems of the two species of plants were intertwined.

"When the large underground stems were examined, they were usually found covered with larvae of various sizes and with cocoons. The larvae were found clinging to the larger roots and feeding on

the fine rootlets with which the roots are covered. Several roots" . . . . "appeared to be covered with minute tubercles. These tubercles are the places from which the rootlets have been cut off by the larvae. In addition to the above, the larvae also eat holes in the apices of the larger roots."

MacGillivray was the first investigator to intelligibly solve the problems of respiration in these larvae, who seem to have no structural modifications adapting them to an underwater life.

Speaking of the tissues of underwater plants—"Each of these spaces is filled with air, and it is on such a supply that the larvae and pupae of Donacia depend. The larvae tap the air supply locked up in the stems of aquatic plants by pushing their caudal spines through the epidermis of the plant and rupturing the cells surrounding the air spaces. The air contained by such plants is of about the same richness in oxygen as the surrounding atmosphere. When the tissue of the plant is ruptured, the inclosed air, being lighter than the water, moves to the outer surface of the plant, and, if there were nothing to collect it, it would pass on to the surface of the water. But the spiracular openings being at the immediate base of the spines and the larva holding the apex of its abdomen close to the surface of the plant, the air is collected before it can escape into the water.

"In order to explain how the larva of Donacia obtains its supply of air from the intercellular spaces of plants, I do not think it is necessary to assume any extraordinary structures for the caudal spines. The caudal spines are nothing more than projections of the body wall for rupturing the tissues of the plant; and, when this is accomplished, the air, being so much lighter than the surrounding water and having a strong tendency to follow along anything that will carry it to a higher level, simply follows along the outer surface of the caudal spines to their base, where it is taken up by the spiracles, while the two large longitudinal trachea connecting with the spines take up the supply of air and act as resevoirs for storing it between the air-taking periods.

"When the larvae are ready to transform to pupae, they spin a tough, brownish cocoon, which is attached to the scars on the upper surface of the rhizome from which the leaf stalks have been shed. The silk is spun from glands opening into the mouth. The cocoons are not only water-tight but air-tight and are of a homogeneous consistency throughout without any indication of a thread-like structure. The bottom of the cocoon where it is attached to the plant is much

thinner and lighter in color and is firmly glued to the surface of the plant."

The larva apparently exludes water from the inside of the cocoon by "surrounding itself while spinning its cocoon by a quantity of air sufficient to fill the vacant space in the cocoon . . . The large excavation" (referring to the slit made by the larva in the stem of the plant) "is always near the center of the cocoon and is undoubtedly made by the larva before transforming to a pupa. In this way the larva provides a continuous air supply for itself by tapping the store held in the intercellular air spaces of the plant. Since some individuals of Donacia live for 10 months or more in the cocoon, need for a copius and continuous air supply becomes apparent.

"The pupa transforms to a beetle long before it is time for it to emerge. When it is ready to emerge, the end of the cocoon is broken off and the beetle crawls out. The ventral surface of most of the species of Donacia is densely covered with fine silken hairs, so that, when the beetle emerges from its cocoon, the air contained in the cocoon at this time is held to the ventral surface of the beetle by these silken hairs and in this way provides an air supply for it till it reaches the surface of the water. This silken cover is also of use to those species that lay eggs under water."

(Haemonia Latreille, 1829)

H. *nigricornis* Kirby 1837 seems the only species known in the United States, and is quite variable as attested by its synonymicon. Blatchley (1910) records it from pondweed *(Potamogeton)*, on which it also occurs in Europe, being known there from the roots of the plant.

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NEW DISTRIBUTION RECORDS OF UTAH SIPHONAPTERA WITH THE DESCRIPTION OF A NEW SPECIES OF *MEGARTHROGLOSSUS* JORDAN AND ROTHSCHILD 1915[1]

VERNON J. TIPTON, 1st Lt. MSC[2]
and DORALD M. ALLRED[2]

The initial studies on Siphonaptera in Utah by Stanford (1931, 1944), and more recently by Hubbard (1947) and others have brought to light much needed information concerning the flea fauna of Utah. Because it has not yet been determined conclusively which species of fleas are involved in the spread and maintenance of disease of sylvatic origin such as plague and tularemia, it is important and necessary to know more about the distribution and ecology of these insects.

Through the collections[3] of the junior author and others, fifteen species and subspecies of fleas are herein reported for the first time as occurring in Utah. Substantiation is also made for collections of three species of fleas made by previous workers whose reports have been listed as of questionable validity. In addition, a new species of *Megarthroglossus* Jordan and Rothschild 1915 is described. The listing of fleas which follows raises the total known species and subspecies for the state of Utah to seventy-five. Information such as host, locality, date of collection, and numbers of each sex of flea collected are given when available. Collectors' names are indicated by initials only, placed in parentheses.

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(2) From the Department of Entomology, Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington 12, D. C., and from the Department of Zoology and Entomology, Brigham Young University, Provo, Utah.

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KEY TO COLLECTORS' NAMES

(CK) Clyde Knudsen
(CLH) C. Lynn Hayward
(DEB) D Elden Beck
(DEH) D. Elmo Hardy
(DMA) Dorald M. Allred
(JSS) J. Sedley Stanford
(RJM) Roy J. Myklebust
(RT) Robert Traub
(VMT) Vasco M. Tanner

NEW DISTRIBUTIONAL RECORDS

Family Pulicidae Stephens 1829

CEDIOPSYLLA INAEQUALIS INTERRUPTA Jordan 1925

Sylvilagus sp.: Zion National Park, Washington County, 17 Dec. 1950, 32♂ 52♀ (DEB) (DMA)
St. George, Washington County, 20 Dec. 1950, 1♂ (DEB) (DMA)

Lepus californicus: 10 mi. NW Kanab, Kane County, 21 Apr. 1951, 1♂ 1♀ (DEB) (CK)

Note: Although Stanford (1944) reported this subspecies as occurring in Utah, some workers have questioned the validity of his record. Additional records herein listed are in substantiation of Stanford's report.

ECHIDNOPHAGA GALLINACEA Westwood 1875

Neotoma lepida: Arches National Monument, Grand County, 14 July 1950, 1♀; 1 Aug. 1950, 1♀ (DMA)

Citellus variegatus: Arches National Monument, Grand County, 22 Aug. 1950, 1♂ (DMA)
Bluff, San Juan County, 4 May 1951, 8♂ 51♀ (DEB) (DMA)

Dipodomys merriami: Grafton, Washington County, 4 Nov. 1950, 2♀ (DEB) (DMA)

Sylvilagus sp.: Zion National Park, Washington County, 17 Dec. 1950, 1♂ 1♀ (DEB) (DMA)
St. George, Washington County, 20 Dec. 1950, 7♀ (DEB) (DMA)

Peromyscus eremicus: 15 mi. E St. George, Washington County, 19 Dec. 1950, 1♀ (DEB) (DMA)

PULEX IRRITANS Linnaeus 1758

Canis latrans: St. George, Washington County, 23 Jan. 1925, 1♂ 1♀ (VMT)
Delta Desert, Millard County, (year) 1925, 2♂ 3♀ (DEH)

Family Vermipsyllidae Wagner 1899

CHAETOPSYLLA LOTORIS Stewart 1926

Mustela sp.: Sardine Canyon, Cache County, 28 Dec. 1937, 4♂ 2♀ (JSS)

Family Hystrichopsyllidae (Tiraboschi 1904)

ATYPHLOCERAS ECHIS Jordan and Rothschild 1915

Peromyscus eremicus: 15 mi. E St. George, Washington County, 19 Dec. 1950, 1♂ (DEB) (DMA)

Note: Stanford (1944) lists a flea as "*Atyphloceras* (probably *echis*)." This record should support his report.

ATYPHLOCERAS MULTIDENTATUS C. Fox 1909

Mouse nest: Pleasant Grove, Utah County, 16 Mar. 1951, 2♂ (DEB) (DMA)

Peromyscus maniculatus: Cedar Valley, Utah County, 25 Mar. 1951, 1♀ (DMA) (CLH)
Lehi, Utah County, 28 Apr. 1951, 1♀ (DMA)

Note: Tipton (1950) reported a flea as "*Atyphloceras* sp. (probably *multidentatus*)." These records undoubtedly substantiate his report.

MERINGIS DIPODOMYS Kohls 1938

Dipodomys merriami: Grafton, Washington County, 4 Nov. 1950, 2♂ 2♀ ; 17 Dec. 1950, 5 ? (DEB) (DMA)
Beaver Dam Wash, Washington County, 21 Dec. 1950, 10♂ 10♀ (DEB) (DMA)
15 mi. E St. George, Washington County, 19 Dec. 1950, 6♂ 11♀ (DEB) (DMA)

Dipodomys microps: Beaver Dam Wash, Washington County, 21 Dec. 1950, 1♀ (DEB) (DMA)

Peromyscus eremicus: 15 mi. E St. George, Washington County, 19 Dec. 1950, 1♂ 4♀ (DEB) (DMA)

Citellus leucurus: Grafton, Washington County, 18 Dec. 1950, 1♂ 1♀ (DEB) (DMA)

Onychomys sp.: 15 mi. E St. George, Washington County, 19 Dec. 1950, 1 ♂ 3♀ (DEB) (DMA)

ACTENOPHTHALMUS HEISERI McCoy 1911

Citellus leucurus: Rockville, Washington County, 18 Dec. 1950, 1♂ 1♀ (DEB) (DMA)

CORRODOPSYLLA CURVATA CURVATA (Rothschild 1915)

Sorex sp.: Bear Lake, Rich County, 14 July 1942, 2♀ (JSS)

CALLISTOPSYLLUS TERINUS Rothschild 1905
Peromyscus eremicus: Grafton, Washington County, 17 Dec. 1950, 2♀ (DEB) (DMA)

ANOMIOPSYLLUS NUDATUS Baker 1898
Peromyscus maniculatus: 20 mi. S Moab, San Juan County, 8 May 1951, 1♂ (DMA) (RJM) (CLH) (CK)

NEARCTOPSYLLA HYRTACI (Rothschild 1904)
Mustela arizonensis: Logan Mountains, Cache County, 9 Dec. 1939, 1♂ 1♀ (JSS)

Family Ceratophyllidae Dampf 1908

THRASSIS PANDORAE Jellison 1937
Citellus armatus: Logan Canyon, Cache County, 9 June 1942, 5♀ 1♂ (JSS)

THRASSIS ARIDIS Prince 1944
Dipodomys merriami: Beaver Dam Wash, Washington County, 21 Dec. 1950, 2♂ 11♀ (DEB) (DMA)

THRASSIS HOFFMANI (Hubbard 1949)
Dipodomys merriami: Beaver Dam Wash, Washington County, 21 Dec. 1950, 2♂ 14♀ (DEB) (DMA)
Grafton, Washington County, 17 Dec. 1950, 2♂ 2♀ (DEB) (DMA)
Onychomys sp.: 15 mi. E St. George, Washington County, 19 Dec. 1950, 1♂ (DEB) (DMA)

ORCHOPEAS SEXDENTATUS NEOTOMAE Augustson 1943
Peromyscus maniculatus: Grafton, Washington County, 4 Nov, 1950, 1♀ (DEB) (DMA)

MONOPSYLLUS EUMOLPI CYRTURUS Jordan 1929
Eutamias minimus: Mammoth, Juab County, 7 Apr. 1951, 1♀ (DEB) (CLH) (DMA)
Eutamias quadrivittatus: N Fork Provo Canyon, Utah County, 22 June 1951, 1 (?) (DMA)
Citellus armatus: Strawberry Reservoir, Wasatch County, 28 June 1951, 1♀ (DMA)

PEROMYSCOPSYLLA HAMIFER VIGENS (Jordan 1937)
Microtus sp.: Logan Canyon, Cache County, 1 Oct. 1948, 5♂ 5♀ (RT)

Family Hystrichopsyllidae

Subfamily Anomiopsyllinae

MEGARTHROGLOSSUS **BECKI** Tipton and Allred, sp. nov.

Diagnosis: The principal distinguishing characteristic by which this species may be separated from other *Megarthroglossus* is the dorso-caudal extension of the eighth sternum, becoming sub-acumi-

nate apically and enclosing the proximal half of the distal arm of the ninth sternum in a hyaline sheath, whereas in other members of the genus the eighth sternum is not produced distad beyond the proximal one-third of the distal arm of the ninth sternum, and is never acuminate or subacuminate but rounded. Near *M. divisus divisus* (Baker 1895), but differs slightly in shape and chaetotaxy of the ninth sternum and movable finger and immovable process of the clasper; sinus of the seventh sternum of the female is truncate and definite, not shallow and rounded; the ventro-caudal lobe of the seventh sternum is acuminate, not rounded.

DESCRIPTION: HEAD (fig. 1, Male). Frontal tubercle present. Frontoclypeal area porose. Ocular row of four bristles; the first and third about half as long as the second and fourth; the first dorsally displaced. Eye vestigial, triangular, slightly pigmented. Genal process sub-acuminate. Maxillary lobe acuminate, reaching to or beyond base of second segment of labial palpus. Labial palpi 5-segmented; almost entire last segment reaching beyond apex of fore-coxa. Bristles of second antennal segment very short, not reaching beyond third segment of clavus. Row of small bristles on dorsal margin of antennal fossa. Two rows of bristles on post antennal area, each row with three small dorsal bristles (four in female) and one large ventral bristle; ventral bristle of second row reaching beyond apex of pronotal teeth.

THORAX: (fig. 1, Male). Pronotum (PN.) with one row of bristles anterior to pronotal comb, with bristles alternately long and short; the ventral-most bristle very long and stout. Pronotal comb of sixteen spines. Mesonotum (MSN.) with four rows of bristles, first row irregular, second and third rows incomplete, bristles of fourth row longest with alternating long and short bristles; row of three pseudobristles on mesonotal flange. Mesepisternum (MPS.) with one long bristle in ventro-caudal angle (in one paratype male bristle lies over internal ridge) and five smaller bristles (seven in female) ranging dorso-anteriorally. Mesepimere (MPM.) with one long ventral bristle. Metanotum (MTN.) with two rows of bristles, the first incomplete, the bristles of the second row longest. Lateral metanotal area very small and not readily evident, with one bristle. Plural arch absent. Metepisternum (MTS.) with one bristle near caudal margin (in female two bristles, the ventral four times longer than the dorsal). Metepimere (MTM.) with one bristle near caudal margin (in female two bristles, one medial and one caudal).

Legs: Measurements.		Tarsal Segments				
Male: Leg	Tibia	1	2	3	4	5
Pro-	183	63	63	53	43	110
Meso-	263	123	96	60	50	120
Meta-	346	230	133	60	50	126

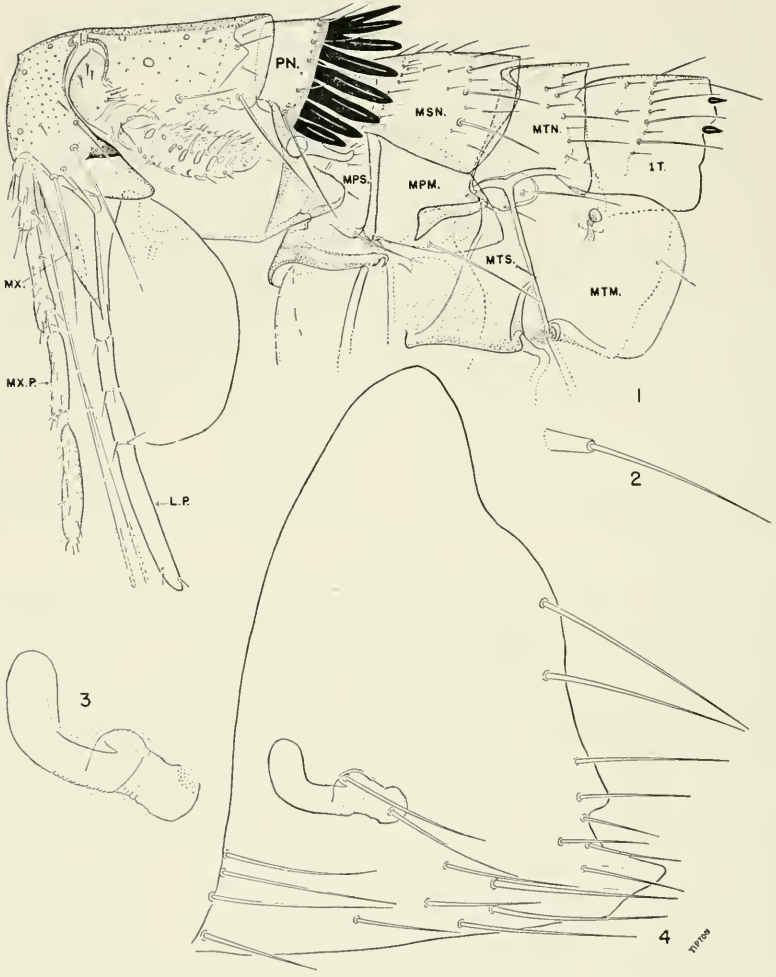

Plate. I. Megarthroglossus becki, new species.

Fig. 1. Head and Thorax (Male)
Fig. 2. Anal Stylet (Female)
Fig. 3. Spermatheca (Female)
Fig. 4. Seventh Sternum (Female)

Female: Leg	Tibia	Tarsal Segments 1	2	3	4	5
Pro-	206	70	73	60	53	116
Meso-	326	143	100	63	50	116
Meta-	400	293	170	73	63	123

ABDOMEN: First abdominal tergum (1T., fig. 1) with two rows of bristles (one row in female), first row incomplete; two apical spinelets on first tergum and one on second tergum (female with one apical spinelet on first tergum and second tergum without spinelets). Terga 2 to 6 with one row of bristles. Sterna 2 to 6 with one row of bristles.

MODIFIED ABDOMINAL SEGMENTS: MALE. Eighth sternum (8S., fig. 6) without bristles; extending dorso-caudally to encompass proximal half of distal arm of ninth sternum in hyaline sheath. Distal arm of ninth sternum (D.A.9, fig. 6) enlarged medially, narrowing apically to become sub-acuminate, with ten bristles on caudal margin and four small mesal bristles; several very fine bristles apically and on anterior margin. Apex of immoveable process of clasper (P., fig. 5) subrounded; anterior to apex of process a prominent gland of unknown function but constant in size and shape in all type specimens; caudal margin of process of clasper undate with a rounded protuberance slightly more than half the distance between apex of process and its junction with moveable process of clasper; four bristles on caudal margin above rounded protuberance, the most ventral being smallest; 2 and 3 more widely separated than 1 and 2, with two small mesal bristles slightly anterior to the three bristles; two small bristles on apex of process with two small mesal bristles anterior to these and two small bristles on dorsal margin. A row of very minute bristles extending from apex of clasper ventrad to about one-half of the distance to point of articulation of moveable finger of clasper. Moveable finger of clasper (F., fig. 5) 3½ times as long as wide; anterior margin almost straight; posterior margin evenly curved; apex rounded; one long thin bristle on caudal margin near apex with a shorter thin bristle on either side; a fourth thin bristle one-half the distance from apex to base, and another near the base; a long thin bristle ventral to point of junction of P. and F. Other small setae on F.; three antepygidial bristles, the middle twice as long as the ventral and the dorsal bristle minute.

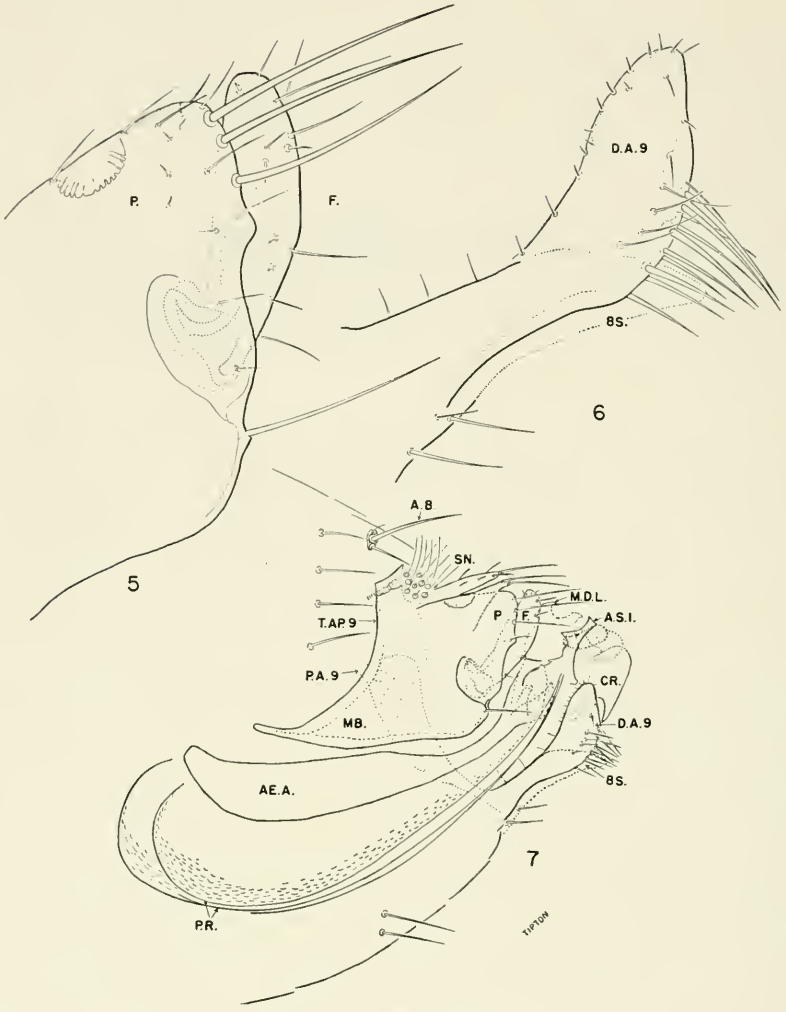

Plate II. Megarthroglossus becki, new species.

Fig. 5. Immoveable process and moveable finger of clasper (Male)
Fig. 6. Distal arm of ninth sternum
Fig. 7. Modified abdominal segments (Male)

Female: Dorsal four-fifths of posterior margin of VII sternum (fig. 4) broadly undate; lower one-fifth with angulate; ventro-caudal area a sub-acuminate lobe. Anal stylet (fig. 2) with a single apical bristle. Head of spermatheca (fig. 3) as long as tail; base and apex

of head of almost equal width with slight constriction in middle. Tail obtuse-angulate. Three antepygidial bristles, the central one longest.

LENGTHS: MALE. 2.14 mm
FEMALE. 2.44 mm

HOLOTYPE: A male, from Buckley's Mine, lower level, Rock Canyon, near Provo, Utah County, Utah. Elevation, approximately 5100 feet. Collected by Dorald M. Allred, November 24, 1949. In the collection of U. S. National Museum. Host: Nest of *Neotoma cinerea acraia* (Elliot).

ALLOTYPE: A female, same data as above except from different nest on upper level, elevation 5200 feet. Deposited in U. S. National Museum.

PARATYPES: Two males and two females, same data as the holotype. Deposited in collection of senior author, and collection of Brigham Young University.

REMARKS: This species is named for Dr. D. Elden Beck, Associate Professor of Zoology and Entomology, Brigham Young University, to whom the authors are very much indepted for his contagious and enthusiastic interest in ectoparasites.

LIST OF ABBREVIATIONS[4]

AE.A.	Aedeagal apodeme
A. B.	Antepygidial bristles
A.S.I.	Apex of sclerotized inner tube
CR.	Aedeagal crochets
D.A.9	Distal arm of male ninth sternum
F.	Moveable finger of clasper
L.P.	Labial palpi
MB.	Manubrium
M.D.L.	Median dorsal lobe of aedeagus
MPM.	Mesepimeron
MPS.	Mesepisternum
MSN.	Mesonotum
MTM.	Metepimere
MTN.	Metanotum

MTS.	Metepisternum
MX.	Maxillary lobe
MX. P.	Maxillary palpi
P.	Immoveable process of clasper
P.A.9	Proximal arm of male ninth sternum
PN.	Pronotum
P.R.	Penis rods
SN.	Sensilium
T.AP.9	Ventral margin of apodeme of ninth tergum
8S.	Eighth sternum
1T.	First tergum

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(4) Nomenclature used is that of Traub's (1950).

ON FIVE NEW AMERICAN LITHOBIID CENTIPEDS

RALPH V. CHAMBERLIN
University of Utah

The new species here diagnosed are members of the order Lithobiida. They were noted in the course of an examination of several lots of chilopods that were in the hands of the author for identification.

Family Lithobiidae

POKABIUS **AETHES** Chamberlin, new species

Dorsum yellowish brown, with the head, first tergite and the posterior borders of the more caudal tergites chestnut.

Ocelli 1 + 4, 4, 3. Antennae composed of the usual twenty articles. Prosternal teeth 2 + 2; the anterior margin of prosternum shouldered ectad of the outer tooth on each side; the porodont hair-like.

Posterior angles of none of the dorsal plates produced.

Ventral spines of the first legs 0, 0, 2, 3, 2; of the penult legs, 0, 1, 3, 3, 1; of the anal legs also 0, 1, 3, 3, 1, the terminal claw simple.

Distinct from all other known species of *Pokabius* sens. str., to to which it belongs, in having the penult as well as the anal legs of the male conspicuously modified. In both of these legs the femur is eleveated into a rounded lobe at the proximal end and is also, though less, elevated at the caudal end, the dorsal surface being concave between the two processes; in both pairs of legs the tibia is longitudinally furrowed along its ventral face, the furrow deeper on the anal than on the penult legs.

Length, about 9 mm.

Locality: California: Willow Creek One male taken by R. V. Chamberlin, July 14, 1937.

GENUS **MESOBIUS** Chamberlin, new

Ocelli seriate. Articles of antennae numerous. Prosternal teeth fixed at 2 + 2. Posterior angles of none of the dorsal plates produced. Tarsi of all legs biarticulate. Distinguished from *Archilithobius* in having the anal legs of the male conspicuously modified, in these the femur being more or less swollen and excised at distal

end on mesal side where bearing a process projecting mesad. Claw of female gonopods bi- or tripartite.

GENEROTYPE: *Mesobius danianus* Chamberlin, new species.

This genus includes also the European *Lithobius castaneus* of Newport.

MESOBIUS DANIANUS Chamberlin, new species

Dorsum light brown, the head and posterior tergites a darker brown.

Antennae long, extending back upon sixth or seventh tergite; composed of 42 articles in the holotype.

Ocelli few, in two series; e.g., 1 + 3, 2(3).

Prosternal teeth small, 2 + 2; the anterior margin of the prosternum rounded off ectad of the outer tooth on each side; porodont subsetiform.

Posterior angles of none of the dorsal plates produced.

Leg 1 with no ventral spines. Ventral spines of the penult legs 0, 1, 1, 1, 0; of the anal legs also 0, 1, 1, 1, 0, with the claw double.

In the anal legs of the male the femur is swollen; obliquely excised at distal end on mesal side and there bearing a mesally directed subcylindrical process which is distally truncate or with distal surface a little convex and which widens a little at base.

Claw af the female gonopods bipartite, the outer lobe much longer than the inner one; both teeth distally rounded. Basal spines 2 + 2, these gradually acuminate from base with the tip narrowly rounded.

Length 10 to 13 mm.

LOCALITY: Florida: Dania. One male and two females.

Distinguishable from *Mesobius castaneus* (Newport), an European species, in having the claw of the anal legs double and in the more sparse spining of the legs.

Family ETHOPOLIDAE

ETHOPOLYS **TIMPIUS** Chamberlin, new species

Dorsum light brown, the head and caudal tergites more yellowish. Legs also light brown, the caudal pairs and the antennae bright yellow.

The head with lateral margining nearly continuous, although

the margin is indented at the level where a definite break occurs in other species. Antennae reaching to or a little beyond the sixth tergite, composed of the usual 20 articles which are mostly long and slender. Ocelli in an elongate patch, with the series curved and irregular; e.g., 1 + 6, 6, 4, 2.

Prosternal teeth ectad of diastema 3, those within typically 6 on each side.

Posterior angles of none of the dorsal plates produced.

Ventral spines of first legs 0, 0, 2, 3, 2; dorsal, 0, 0, 2, 2, 1. Dorsal spines of second legs, 0, 0, 3, 2, 1. Ventral spines of penult legs 1, 1, 3, 3, 2; dorsal, 1, 0, 3, 2, 1. Ventral spines of anal legs, 1, 1, 3, 2, 1; dorsal, 1, 0, 3, 1, 0; claw double.

Claw of genital forceps of female long and acute, a weak tooth on each side. Basal spines 3 + 3.

Length, 30 mm.

LOCALITY: Utah: Provo Canyon, Briday Veil Falls at upper limits.

Apparently distinct in the absence or slightness of a lateral marginal break on the head. Related to *E. integer* Chamberlin but different in having low but distinct lateral teeth on the claw of the female gonopods. Resembling *E. bipunctatus* (Wood), which occur in the same general area, in color but obviously distinct in the shorter antennae and in having normally 3, instead of 2, posternal teeth ecad of the diastema on each side.

ETHOPOLYS **CALIBIUS** Chamberlin, new species

Dorsum dark chestnut, the posterior segments in particular with a median longitudinal stripe of darker color. Legs also chestnut colored proximally, lighter over tarsi.

Antennae long, reaching back upon the eighth tergite; composed of 20 articles which are mostly long and proportionately slender. Head with lateral marginal breaks. Ocelli 1 + 5, 5, 4, 3, the single ocellus large.

Prosternal teeth 9 + 9 with no diastema and a definite porodont not detectable in the type specimen.

Posterior angles of none of the dorsal plates produced except those of the thirteenth on which they are small and acute. Tergites rugose, especially the more posterior ones.

Ventral spines of first legs 0, 0, 2, 3, 2; dorsal, 0, 0,. 3, 2, 1. Ventral spines of penult legs, 1, 1, 3, 3, 2; dorsal 1, 0, 3, 1, 1; the claw single. Ventral spines of anal legs 1, 1, 3, 2, 1; dorsal 1, 0, 3, 1,

0. Last four pairs of coxae armed ventrally, the last two laterally.

Claw of the female genital forceps with a large acuminate median lobe and a small tooth each side well toward the base. Basal spines 4 + 4.

Length: 28 mm.

Locality: California: Prairie Creek. One female taken July 10, 1946.

Distinct from other known species of the subgenus *Archethopolys* in lacking a diastema in the prosternal dental series and in having claw of the female gonopods practically entire.

ETHOPOLYS **SPECTANS** Chamberlin, new species

Dorsum, including head and antennae, light chestnut, with a darker median longitudinal line evident posteriorly. Legs brown. Antennae relatively shorter than in related species; composed of the normal 20 articles which are of moderate length. Head with lateral marginal interruptions distinct. Ocelli in three series forming an oblong patch; thus, 1 + 4, 4, 2.

Prosternal teeth 9 + 9, one of these teeth on each side occupying the space usually forming the diastema, this tooth lying in front of the fine porodont, one tooth ecad of this one.

Posterior legs missing from the type.

Posterior angles of ninth, eleventh and thirteenth dorsal plates acutely produced but the processes unusually small. Tergites irregularly rugose, most distinctly scabous on the caudal portion.

Claw of the female gonopods with an acute median lobe or tooth which is moderate in length, the side teeth blunt and weak. Basal spines 3+ 3.

Length, 19 mm.

Localitys British Columbia; Vancouver Id., Spectacle Lake. One female taken by Dr. G. C. Carl on May 12.

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